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Propulsion of Ships and Aquatic Animals.

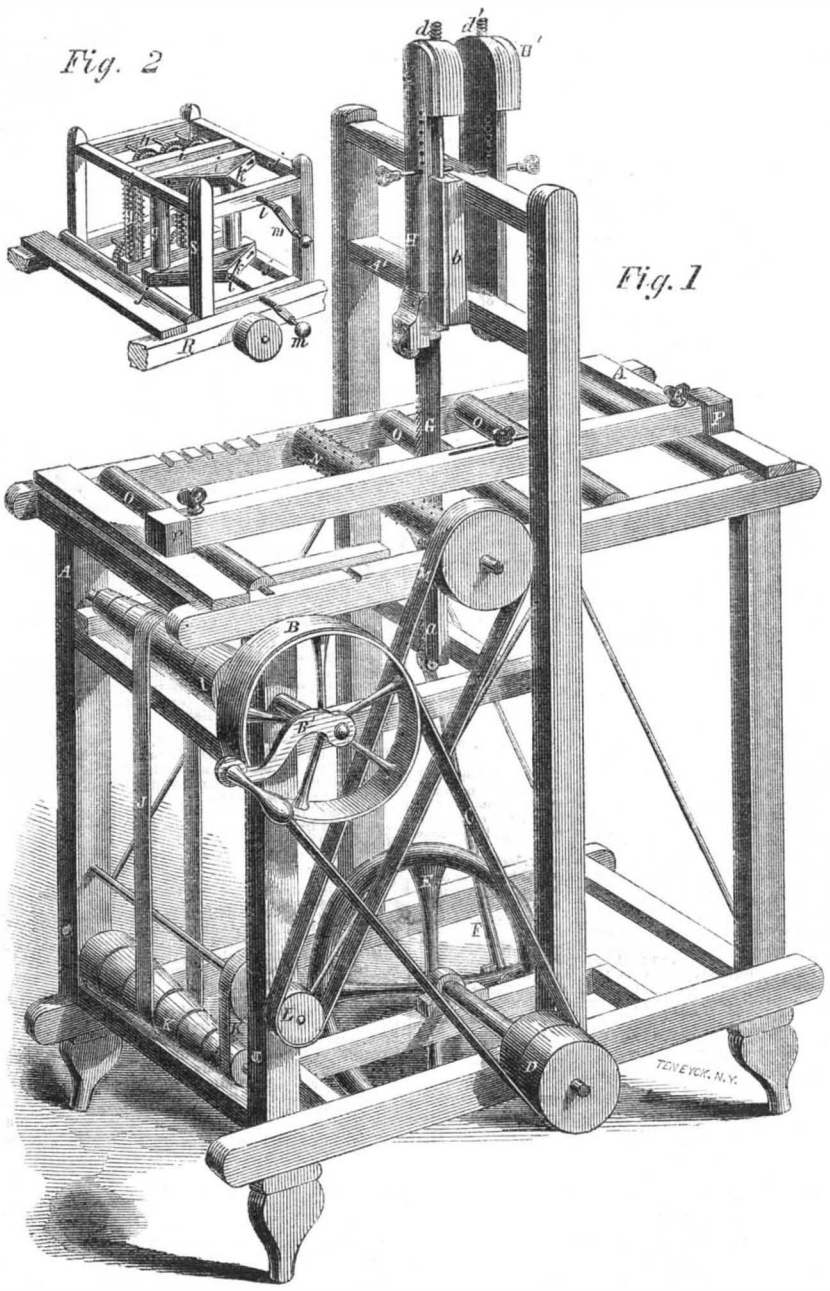
In a paper recently read before the Society of Arts of London, by J. MacGregor, on the paddle wheel and screw propeller, it was observed that in the modes of propulsion employed by aquatic animals may be found almost every plan which has been used by man with machinery. Thus, water is ejected for propulsion by the cuttlefish and "paper nautilus;" sails are used by the velella and water birds; punting and towing by whelks and some others; a folding paddle by the lobster; feathering paddles by ducks; and oblique surfaces by fish of all kinds. A screw-like appendage is found in the wings of an Australian fly, but it is supposed to be shaped thus only when dried after death. These are well known instances of similarity of natural and artificial means of propulsion; but the author of the above-named paper mentions a remarkable animal which propels itself by a rotary movement, acting on the water by means very similar to those of the paddle wheel and screw propeller combined. This is the infusorial insect "paramecium," which is of an irregular oval or egg-shaped form, with a sulcus or furrowed groove or depression running obliquely round its body. A wave-like protuberance passing along this sulcus (with or without cilia) causes the body to rotate on its longer axis, and thus propels it by the fore and aft stroke of the paddles which the cilia on its surface form, as well as by the screw-like progress induced by the spiral groove.

Method of Preparing Kid Leather.

Yelk of egg is largely used in the preparation of kid leather for gloves in France and on the continent of Europe, in order to give it the requisite softness and elasticity. The treatment of the skins with yelk of egg, which is called by the French glovemakers *nourriture*, is daily becoming more costly, in consequence of the large consumption and increased price of the material used. It has recently been proposed to substitute for the yelk of egg the brains of certain animals, which in chemical nature closely resemble the yelk of egg. For this purpose the brain is mixed with hot water, passed through a sieve, and then made into dough with flour and alum, and used in the same manner as yelk of egg. The inventor of this substitute states that the quality of inferior skins may be so much improved by this treatment as to be fit for making gloves.

The Indians of our forests employ this very agent (brains of animals) for preparing their skins for mocassins, &c. They employ the brains of deer and buffalo, mixed with a weak lye of wood ashes, and after this they smoke the skins; the pyroligneous acid of the wood in the smoke accomplishes the same object as the alum used by the French skin dressers. Indian prepared skins stand the action of water in a superior manner to French kid. Furs dressed in the same manner resist the attacks of insects.

BARTHOLOMEW'S IMPROVED SAWING MACHINE.



The inventor of this machine—D. B. Bartholomew, of Lancaster, Pa.—has produced a compact arrangement of parts that will enable any one to have a good sawing machine in their workshop, not only at a low price, but also one which requires but little power, as he makes them from small enough to be operated by hand, up to any size required.

That it is more advisable to cut with a saw which has a regular and equable motion must be apparent to every one; and this machine gives this advantage without much more labor than if a hand-saw was used; besides, it will cut stuff much thinner than could be done by a hand-saw, and of greater thickness, that is, with the same precision.

Our engraving is a perspective view of one of these machines, Fig. 2 being an additional portion.

A is a framing of wood, well secured together, and having a supplementary framing, A′, rising from it by two uprights. B′ is a crank, by which the band wheel, B, is rotated; and C is a belt passing around it, and communicating motion to the pulley, D, on the shaft of a fly wheel, E. To this fly wheel, E, there is attached a pitman, F, that gives a vertical reciprocating motion to the saw, G. The saw, G, moves up and down in guides, *a*. attached to the frame, A, and guides, *b*, attached to A′. To the guides, *a*, there are inclined coverers, that prevent the sawdust choking the guides, and throw it on each side. In the guide, *b*, there slides a piece, H, on the lower end of which is a roller, and from the upper end a screw, *d*, projects, to which a weight can be attached. There is also another piece, H′, on the other side of the saw, provided with a screw, *d*′, also for carrying a weight; these are kept up by pins, *c* and *c*′, which being withdrawn, the bars press upon the stuff, and hold it down on the feed rollers while it is being sawed.

The feeding apparatus is operated by means of a cone pulley, I, on the shaft of B, and by means of the belt J, cone pulley K, belt K′, pulley L, and belt M, the feed roller, N, is moved. This feed roller is provided with teeth, and as the machine is represented in Fig. 1, it is suitable for sawing stuff of general thickness. O, O, O, are rollers on which the stuff runs, and the bar resting in the ends P, P, is a gage bar that can be fixed to any gage by the set screws, *e*. For sawing thin stuff, the feed roller N, is removed and also the guide bar, and the frame, S R, is placed on in front of the saw instead. In this frame the stuff to be sawed is placed between the feed rollers, *g*, which have a positive motion given them from the belt M, by gearing. The toothed rollers *g*, are pressed up to the stuff by the handles and gearing *h*, and they are mounted in pieces, *i*, which slide on the cross-pieces, *j*, and *j*′, of the frame S. The other rollers. *g*, which press against the other side of the stuff are kept against it by springs, *k*, which are kept in the proper state of tension by the screw shafts, *l*, rotated by the crank handle, *m*.

This machine was patented by the inventor December 29, 1857, and any further information can be obtained by addressing him as above.

The novelty is chiefly in the feed rollers, for in other sawing machines the feed has been irregular and unsteady, but in this form of the feed apparatus, receiving positive motion from the same shaft as the saw, both are equally steady and reliable.

Culture of Fish.

Some very excellent information on the above subject, by Robert L. Pell, President of the American Institute, has been published in the New York *Evening Post* for the benefit of farmers. The following are a few extracts:—

Fish eggs may be transported to great distances, without fear of failure, particularly the salmon and brook trout, which require from sixty to ninety days to mature. When two black specks are seen through the membraneous cuticle that covers the egg, they may be packed for exportation. The best plan is to place them between wet woolen cloths, about fourteen inches square, and pack in alternate layers in boxes, perforated at the top and bottom, so that the water used to moisten them at stated periods, may pass off, after having saturated them sufficiently.

If intended to be sent to a very great distance, you may place a layer of coarse sand, partially wet, in the bottom of a box four inches in depth; on this lay the prepared eggs separately, and cover them with an inch of sand—then eggs and sand alternately until the box is full; before the cover is screwed on, place the whole for two hours in water and ship it.

I once transported twelve hundred trout, of all sizes, to one of my ponds with perfect safety, from a distant brook, without changing the water, making four journeys, thus:—A large tierce was put upon a spring cart, and filled with pure spring water, into which an abundance of ice was placed. As the trout were caught by treading the brook, and thus driving them into a net, they were imprisoned in the tierce without handling, and arrived at the pond in safety; without ice, they would have perished in half an hour.

You may carry young salmon or trout in glass jars by railroad any distance without changing the water, by placing a few aquatic plants in with them.

I am convinced that with judicious care, and ponds suited to the purpose, a branch of industry might be formed that would increase the wealth of the party attending to it unparalleled by any other business.

Let me, then, recommend all gentlemen living near the coast on Long Island and in New Jersey, wherever facilities offer, to make salt water ponds, by calling to their aid a portion of the sea, which may be carried inland by means of a short canal, and therein place fish to fat, besides breeding oysters.

It is possible to stock every stream in the state of New York with all the desirable varieties of fish in a single season, and all the waters in the United States in a single year.

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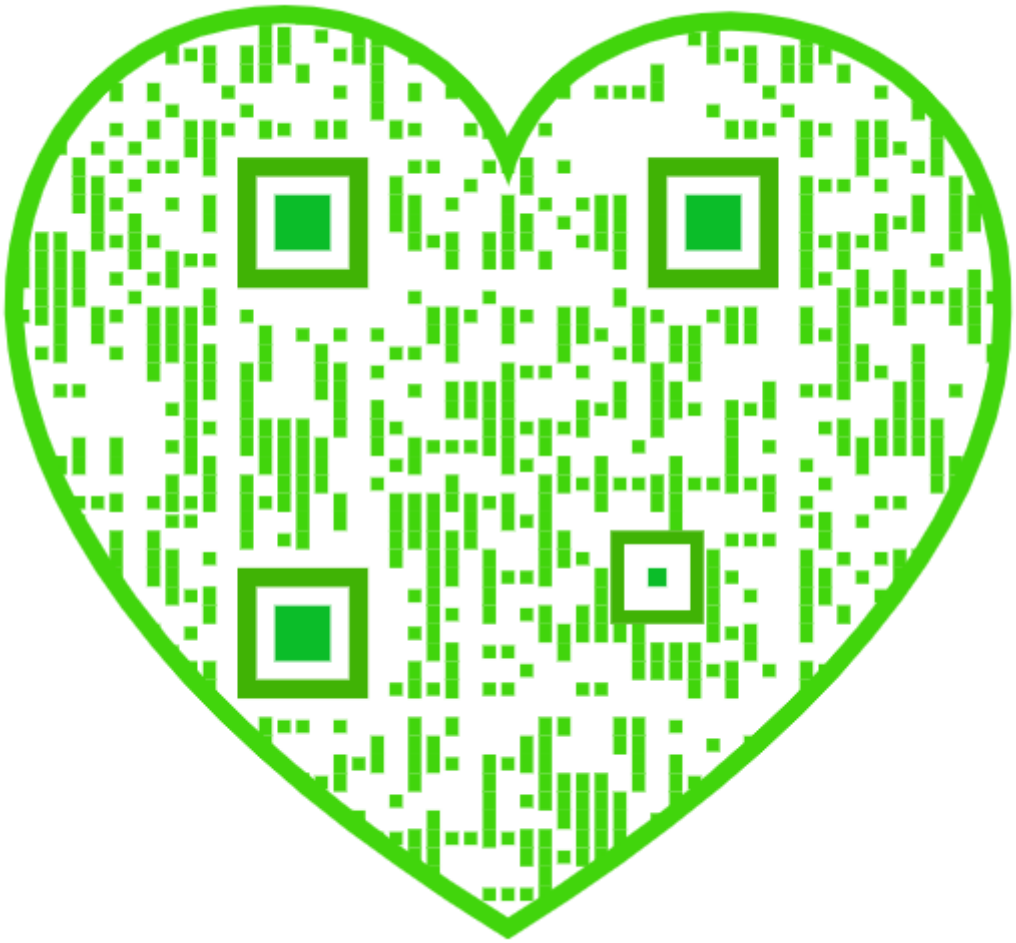

Issued from the United States Patent Office

FOR THE WEEK ENDING MAY 25, 1858.

[*Reported officially for the Scientific American.*]

VALVE COCK—Seth Adams, of Boston, Mass. : I do not claim any of the stop cocks to which I have had occasion to refer in the explanation of the difference between them and my improved disk valve cock.

But I claim my improved disk valve cock, made substantially as described, viz., with one coupling pipe, a valve seat, disk valve, and valve chamber, arranged and applied together essentially as specified, so that when the valve may be raised above the bore of the coupling pipe, and a column of fluid may be passing through the said pipe, such column shall flow through the pipe and valve chamber, in a line with the axis of the pipe, or in a straight line, and enter the valve chamber at one side, and pass out of its bottom, or enter at its bottom and pass out of its side and through an opening of the valve seat, whose sectional area shall be equal to, or greater than, that of the bore of the coupling pipe.

BREECH-LOADING RIFLE—C. W. Alexander, of Moorefield, Va. : I claim the replaceable rifled cylinder, with its dovetail for cap, and notch for holding it in its place, in combination with the revolving chamber that bears it, and holds it to its place.

FURNACE GRATES—A. J. Allen and W. S. Hudson, of Paterson, N. J. : We claim the combination together of the vertically moving furnace bars, C, furnished with projections, l, when arranged and operating substantially as shown and described.

[A notice of this invention will be found on another page.

DRIVING WHEELS FOR PORTABLE STEAM ENGINES, AGRICULTURAL IMPLEMENTS, &c.—George W. Barnett, of Springfield, Ohio : I claim providing a wheel with one or more series of radial elastic feet, in the manner and for the purposes substantially as set forth.

STEAM BOILERS—George W. Barnett, of Springfield, Ohio : I claim, in combination with a furnace arranged centrally within the boiler, the smoke flues and exhaust pipes, when so arranged that the smoke and waste heat of the furnace, as also the exhaust steam, shall be conducted together downward through the water in the boiler in the same pipes, for the purposes set forth.

COMPOSITION FOR VARNISHING LEATHER—O. S. Boydon and M. C. Fredericks, of Newark, N. J.: We claim the employment in the compounds used in the manufacture of glazed, japanned, or painted leather, cloth, silk, and paper—either wholly or in part as a substitute for camphene or spirits of turpentine—of a paste made of the glutinous properties of flax seed, substantially as and for the purposes set forth.

[A notice of this improvement will be found in another column.]

SOUNDING APPARATUS—Richard F. Bridewell, of St. Louis, Mo. : I do not claim, broadly, the application of a lever to the bow of a vessel to indicate the depth of water beneath the bottom.

But I claim the use of a lever applied to the bow of a vessel, so constructed, combined, or arranged as to vibrate in either direction, substantially in the manner described, for the purpose specified.

MACHINE FOR HOISTING ICE—William G. Brower, of Stoutsburgh, N. Y. : I claim the receptacle or box, D, connected with the drum or windlass, H, by the chain or rope, G, the drum or windlass being fitted loosely on the driving shaft, I, and connvcted with and detached from it at the proper time by means of the clutch, J, actuated through the medium of the sliding bars, K N, spring, L, and lever cate es, O O, the whole being arranged substantially as shown, so that the several parts will operate automatically by a continuous motion of the driving shaft and for the purpose set forth.

LATHES—Jared T. Bunce, of East Haddam, Conn. : I do not claim the screw, F, and a nut, E, nor the pinion g, and rack, i, for moving or feeding the slide rest, for these are well-known devices, and in common use for such purpose.

But I claim constructing the slide rest of two parts, C D, arranged as shown, so that the part, C, may have a movement independant of the other, in combination with the nut, E, formed of the parts, j k, operated as shown, and used in connection with the worm wheel, s, which is actuated simultaneously with the parts j k, of the nut, substantially as described.

[This invention consists in having the slide rest formed of two parts, so connected that one part is allowed a movement independent of the other, and the whole so arranged that the tool may be easily adjusted to its work, the nut readily thrown in and out of gear with the driving screw ; and the wear of the seat is compensated for, so as to ensure the perfect operation of the device.]

VAPOR LAMP BURNERS—Daniel H. Carpenter, of New York City : I claim the device set forth of regulating the quantity of air to be mixed with hydro-carbon vapor, consisting of the screw stop placed in the tube at such distance below the exit aperture as shall leave the requisite space for the mixing of the gases before reaching said aperture.

I also claim the described improvement in the construction of the valve for the vapor passage, whereby the said passage is kept free at all times, without increasing the size thereof, substantially as set forth.

HARROWS—Vasco M. Chafee, of Grayville, Ill. : I claim the combination of the side pieces, D D', cross bar, C, or their equivalents, with the rotary harrowing wheels, the parts being so arranged in connection with each other, substantially as described, to produce the result stated.

DEVICE FOR ACTUATING THE INDEX OF HYGROMETERS—Charles L. Clarke, of Rochester, N. Y. : I do not claim to have invented the employment of a twisted cord operating on the principle described, to indicate the hygrometric condition of the atmosphere.

But I claim the combination of the slotted weight, D, with the shaft, E, as shown and described, whereby shaft E is actuated by the horizontal rotation of weight D, without obstructing the vertical movement of the latter.

[A notice of this invention will be found in another column.]

FLOURING MILLS—James M. Clark, of Lancaster, Pa. : First, I claim the arrangement of the apertures, T and i, in the conveyor case, M, with the slide valve, O, constructed and operated as set forth.

Second, I claim the combination of the movable or stationary conveyor with, and formed on the shaft of, the bolting reel, for the purpose of conveying the material into the bolt te any required distance, to effect the object fully specified.

RECIPROCATING PADDLE—Peter C. Clark, of Reading, Pa. : I claim the arrangement of the lever, e, having an adjustable paddle, with the radius bar, d, and crank arm, b, in their relation to each other and to the crank shaft, as and for the purpose set forth.

FLOURING MILLS—Edwin Clark, of Lancaster, Pa. Ante-dated February 2, 1858 : I am aware a series of valves and a circular division has been used in bolting machines ; these I do not claim.

But I claim the valve or series of valves, b, with their perforations, c, in combination with the apertures, d e, in the bolting chamber, so as to make said valves common to the three different transits of the ground material, substantially as described.

I also claim in combination with the circular division, F, the inclined planes, i, for properly conducting conducting that portion of the material that falls upon the space between them, into its proper channel, as set forth.

MACHINE FOR GRINDING SAWS—William Clemson, of East Woburn, Mass. : I claim the employment of a revolving friction clamp, applied to the saw in the manner substantially as described, to receive rotary motion from the saw, and to control the revolution of the saw by the momentum it acquires by such rotary motion, as fully explained.

[See notice of this improvement on another page.]

LUBRICATING CAR AXLES—John W. Cochran, of New York City : I claim the arrangement of the rollers upon the coil, e, said coil having within it a shaft or rod of metal or wood with the rods, d, attached to studs, e, in their relation to each other and to the box and axle, as and for the purposes set forth.

VALVE PROPELLER—Aaron Colton, of Le Roy, N. Y. : I claim the connection of the paddles with the sliding frames, C C', and the flat plates, E, in combination with the stops, i, constructed and operated substantially as described.

[This invention relates to paddles placed in horizontally sliding frames, and it consists in attaching the same by means of pivots between their centers and their upper edges, to these frames ; the upper edges being guides by loops, which are attached to horizontal plates that are placed on the top of the sliding frame in such a manner that they assume a sliding motion, independent from the motion of the frames, whereby the paddles are inclined either one way or the other ; and it further consists in a peculiar arrangement of stops, so constructed that by placing the same either on one side of the paddles or on the other, the latter are made to propel the vessel forward or backwards, and that by releasing the stops altogether, the paddles move both ways with the sliding frames, and have no propelling effect.]

BURGLAR'S ALARM LOCKS—Addison Corey, of Casstown, Ohio : I claim the application to door locks of the insulated knob, these extra bolts, levers, and springs in this arrangement with any lock, and these several galvanic attachments in combination with the lock, as described, or any others substantially the same, and which will produce the intended effect.

HARVESTERS—J. H. Conklin, of Rockford, Ill. : I claim, first, The vibrating divider, G, in combination with the cutting apparatus, substantially as described, whereby the grain is gathered into the cutters, in order that the parts of the machine following after may perfectly clear the standing grain, as described.

Second, The curved or turned up and slotted ends of the finger bar, e, as set forth, in combination with a vibrating lever, S, as and for the purpose specified.

CARPET FASTENER—Warren Filkins, of Lancaster, N. Y. : I claim the arrangement of the horizontal swinging slotted cap, a, with the plate, e, and the spur, b, in the manner specified, and for the purpose set forth.

WATER WHEELS—John Custer, of Finley, Ohio : I do not claim, broadly, so forming the buckets of horizontal water wheels that the percussive force of the water, as well as that caused by gravity, are obtained, for buckets have been devised and arranged in various ways to accomplish this purpose.

But I claim, first, Placing the plate, i loosely on the shaft, B, and rendering the same adjustable thereon by means of set screws, b, or their equivalents, in connection with the adjustable mouth, F, in the sluice, D, the parts being arranged substantially as shown and described, for the purpose set forth.

Second, The buckets, C, constructed of the form shown and described, so that the percussive force of the water is obtained, and also the force produced by its weight, as it passes from the buckets, and the water at the same time allowed to pass in a very direct and uninterrupted manner through the buckets, so as not to occasion much loss of power by friction.

[The wheel and shute of this wheel are arranged in such a manner that the wheel is capable of being raised and lowered as circumstances may require, and the water properly directed into the buckets at any point or portion of the wheel within the range of its adjustment. The buckets are constructed so that a large percentage of power is obtained, and the wheel is rendered simple and economical.]

WIND WHEELS—William H. Derrick, of Stockton, Cal. : I claim the movable or traversing vane, G, with weight, H, attached in combination with the permanent or stationary vane, F, arranged as shown, or in an equivalent way to operate as and for the purpose set forth.

[The object of this invention is to render the wind wheel, by a very simple means, self-regulating and self-adjusting, so that the wheel will rotate with equal, or nearly equal speed, during variable degrees of velocity of the wind, or made to veer in accordance with it.]

LEVELING DEVICE ATTACHED TO HAND SAWS—Henry Disston and Thomas L. Morss, of Philadelphia, Pa. : We claim placing the two spirit tubes, or levels, a a, in the handle, B, of the saw, relatively with each other, and the back edge, c, of the saw, substantially as and for the purpose set forth.

[On one side of the handle of a saw two spirit levels are placed at right angles to each other, and in such a position relatively with the back of the saw, that the same may be used as a plumb and level indicator as well as a saw, and used in either capacity equally as well as separate tools for the respective purposes.]

WINDOW SPRING—Edward Doen, of New Britain, Conn. : I do not claim any of the parts described, separately considered.

But I claim the combination of the independent obtuse-angled lever and direct-acting spring bolt, arranged for action together relatively to each other and the face plate of the casting, which carries both, and for connection with the window casing as a fastener to the sash, as set forth.

RAILROAD CAR BRAKES—C. H. Eisenbrandt, of Baltimore, Md, : Being well aware that rubber devices and friction rollers have been applied to the partial surface of axles, I do not claim such devices.

But I claim the manner or mode of direct application to the axles of the wheels, of the lever, and screw, L m m d2 b2, with the clasping boxes, f f, griping collars, y z, and the pivot and socket axles, g h, the pendant bearings, c c c, with the box seats, e e e, the connecting yoke eye rods, c2 d2 o o o, the ear guides, X X, the whole arranged, combined and operated with the other devices described, and substantially in the manner set forth.

KNIFE POLISHER—Horace T. Field, of New Baintree, Mass. : I claim the combination of the annular buffers with the disks, when arranged on the adjacent faces of both disks, as described, for the purpose set forth.

GANG PLOWS—Jesse Frye, of Mendota, Ill. Antedated March 18, 1858 : I claim the attachment of the tongues to the forward and rearward plow-stocks, and the connections between the various plow-stocks, so that when the team is turned, the plow shall be turned so as to point towards a common center, substantially in the manner and for the purpose described.

I also claim the connection of the forward furrow wheel with the tongue by means of the curved slotted arm, R, and bolt, l, in combination with the cranks, and connecting rods between the wheel shafts, so that when the team is turned, the forward wheels shall be turned in the same direction, and the rear furrow wheel shall be made to track the forward wheels, substantially in the manner and for the purpose set forth.

I also claim hanging the hinged coulter, t, to the rear of the front furrow wheel by means of a chain, which, when the team is turned will raise said coulter out of the furrow, substantially in the manner and for the purpose set forth.

APPARATUS FOR CATCHING FISH—Jacob Garl, of Suffield, Ohio : I claim the sliding trigger, E, the notch, B, key, F, nut, g, as applied to a machine for catching fish, and described in my specification for that purpose.

MACHINE FOR TURNING IRREGULAR FORMS—Newton J. Glover, of Waveland, Ind. : I claim two traversing and vibrating cutters arranged to work on the opposite sides of the piece of wood turned in the way and manner described.

I claim arranging the nuts or racks of teeth (upon which the screw, E, acts to traverse the cutters) upon the cutter bars in such a way and manner that when the cutters are brought into action, the racks will be brought to the screw so as to traverse the cutters, and when the cutters are thrown out of action the racks which traverse them are released from the screw, as described.

CUTTER HEAD AND TABLE REST FOR CUTTING IRREGULAR FORMS—J. P. Grosvenor, of Lowell, Mass. : I claim, first, The rest, H, in combination with a cutter head, operating in the manner set forth for the purpose specified.

Second, I claim securing the cutters to the head by means of grooves in the collars, as set forth, when the cutters are set in planes forming angles with each other as described,

CHEESE PRESSES—Jacob Hibbard, of Weathersfield, N. Y. : I am aware that progressive power presses have been previously used for compressing hay, cotton and other substances, and I do not claim therefore, broadly, such operation.

But I claim the combination, as described and shown of the levers, I G, connecting rods, F H, weight, L, and follower, D, for the purpose set forth.

[This invention consists in operating the follower of the press by a system of levers, and a weight arranged as shown, whereby a progressive power is obtained, and the cheese or curd so acted upon or subjected to such a pressure that all the whey and useless substances will be expelled or expressed from it, and all the cream or oily and essential substances retained.]

MANUFACTURE OF DEXTRIN AND SUGAR—T. A. Hoffmann, of Beardstown, Ill. : I disclaim the separate action of steam and acids for converting starch, corn, or other grain into dextrin, or sugar, and alcohol therefrom by the usual boiling point of one atmospherical pressure.

But I claim the combination of steam and acids for converting starch, corn, or other cereals into dextrin gum, or sugar, when said grain is subjected to the action of diluted acids, and the temperature of the mass is elevated to 225° or 300° Fah.

THERMOSTAT—Simeon Holton, Jr., of Middlebury, Vt.: I claim no part of the instrument, bnt the means of adjusting the movement of the pointer relatively to the expansion and contraction of the compound bar.

But I claim the slotted plates, l and j, carrying the pin, K, and the notch in which it works applied to the compound bar, and the lever, G, substantially as described, to vary the effective length of one arm of said lever, and yet preserve its proper relation to the compound bar, and operating as set forth.

[See a description in another portion of this paper.]

OMNIBUS REGISTER—R. E. House, of Binghampton, N. Y. : I claim the combination of a step protected substantially as described resting on a yielding support, such a spring or its equivalent with recording mechanism to be operated by the step, substantially as and for the purpose described.

WIND WHEELS—J. B. Johnson, of San Francisco, Cal. : I do not claim operating the adjustable sails, i, by means of the sliding head or plate, I, actuated by a governor through the medium of the levers, as shown, for this has been previously used.

Nor do I claim the manner of attaching the rotating plate. C, to the framing, A, for this has also been previously done.

But I claim constructing the wind wheel, G, with stationary and adjustable sails, h i, substantially as and for the purpose as set forth.

[This invention consists in a peculiar means employed for giving a uniform speed to the wheel, during variable degrees of velocity of the wind, and also in a peculiar means employed for stripping the wheel when desired.

APPARATUS FOR SEPARATING THE COMBUSTIBLE FROM THE INCOMBUSTIBLE GASES OR PRODUCTS OF COMBUSTION IN FURNACES, &c.—Wm. D. Jones, of Hagaman's Mills, N. Y. : I do not claim the returning of the combustible portion of the volatile or gaseous products of combustion to the fire.

Nor do I claim, broadly, the separation of the combustible from the incombustible products by the difference in their specific gravity.

But I claim the box, A, with its inlet, a, separating diaphragm, b, chambers, B, and C, pipe or passage, f, and two fan blowers, D and F, arranged in the manner substantially as described and operating as set forth.

[See description of this invention on another page.]

IRON GATE OR FENCE POST—F. E., Alex. and Edwin King, of Cherry Valley, Ohio : We claim a fence post composed of the parts, G and K, provided with toothed or serrated edges, a a, arms, B, and keys, C, and in combination therewith the wings, i i, and stud, o, when constructed and arranged substantially in the manner and for the purpose specified.

We also claim the manner of securing the gate hinges, D, by means of the lugs, c c. and notches, a a, the same to be held in place by the keys, C, as described.

PRODUCTION OF ELECTROTYPE PLATES—S. P. Knight, of New York City : I do not cl im the deposit of a thin metallic coat or film upon the molds previous to immersing them in the battery.

But what I claim is the treatment of the plumbago coated molds with a solution of the sulphate of copper and the dust of iron, by which a metallic film is produced as described.

MARINE ALARM AND FOG SIGNAL—Leon Lewenberg, of New York City : I do not claim a spring or springs acted on by a ratchet wheel for producing sound, as this has before been made use of.

But I claim the hollow cylinder or drum, f, open at the ends and fitted with the ribs or plates, l, when arranged to act on and within the circular ranges of metallic springs, h, attached to the rings, g, for the purposes and as specified.

PROTRACTOR—Josiah Lyman, of Lenox, Mass. : I claim the arrangement of the several verniers, limbs, scales and rule in one instrument in the manner described for the purposes set forth.

I also claim the peculiar arrangement of the sliding vernier scale, by which it can be applied with equal readiness and facility to either side of the rule, so as to read the given angle and its complement.

PREPARING PAPER PULP FROM REEDS—Henry Lowe of Baltimore, Md. : I claim the described process o making paper pulp from reeds by first disintegrating the reeds by boiling in a solution of caustic soda, accompanied by agitation, and then reducing them directly to pulp without reducing to half stuff by the machine technically called the old rag engine.

SEEDING MACHINES—Joseph McCammon, of Dayton, Ohio : I do not claim separately the adjustable slides, F G H, having apertures made through them and attached to the underside of the hopper, for the purpose of varying the size of the discharge apertures for they have been proviously used.

But I claim the blades, b, attached to the rotating shaft, D, which is placed within the hopper or seed box, A, and arranged substantially as set forth, in combination with the adjustable slides, F G H, and concave bottom, E, the whole being arranged to operate as and for the purpose set forth.

[A peculiar means is employed for distributing the seed in this invention, whereby the seed is prevented from "arching" in the hopper or seed box, and presented in a proper manner to the discharge apertures, the size of which may be graduated so as to sow a greater or less quantity of seed in a given area or space.]

SEEDING MACHINES—G. M. L. McMillen, of Dayton, Ohio : I claim the employment or use of the shaker, G, placed between the rotating flanches, E E, and operated by the curved rod, F, and cam, C, the sliding plates, J M, gage, K, and cylinders, D D, the whole being combined and arranged to operate as and for the purpose set forth.

[This invention consists in the employment of regulating slides, a gage, and a shaker, arranged and operated so that the discharge of the seed may be regulated as desired, and the device effectually prevented from being choked or clogged,]

FOOT CLEANER—Allan McKeachnie, of New York City : I am aware that brushes have been previously combined with scrapers for the purpose of cleaning the feet, but so far as I am aware stationery brushes have been only used and arranged in a very inefficient manner. I therefore do not claim, broadly, a scraper combined wi h brushes irrespective of the construction and arrangement shown and described.

But I claim the scraper, B, in combination with the rotary brushes, D, and elastic rotary brushes, E E, with or withovt the cleaners, h f f, the above parts being placed within a suitable shell or basin, A, and arranged as and for the purpose set forth.

[By means of a scraper, rotary brushes and brush cleaners, placed in a proper frame or basin, a very convenient device is obtained to scrape and brush the shoes or boots quite clean before entering a house.]

CORN HUSKERS—B. B. Meacham, of Ridlyville, Fla. : I claim the wheel, E, grooved circumferentially and provided with the knife or cutter, g, forked plate, h, and oblique partition or ledge, c, and arranged relatively with the spouts, C G, so as to operate as and for the purpose set forth.

[In this invention a cutting device is attached to a wheel which is placed below a trough or spout, the cutting device and wheel being so constructed that as the ears of corn are fed down to it, the butts will be cut off from the ears at their junction with them and the husks stripped off, and the husked ear will be discharged by another spout.]

STRAW CUTTERS—O. Moses, of Malone, N. Y. : I am aware that a toothed vibrating feeding roller has been used in straw cutters in conjunction with a rigid cleaning comb, and therefore I claim the arrangement of the bridle pieces or connecting plates, e e, attached to cleaning comb, d, with driving shaft, a, and journals, c c, of feeding roller, F, the whole being constructed for operation conjointly with feed-box, A, rest l, shaft, b, disk, T, and knives, l, in the manner and for the purposes set forth,

BED BOTTOM—J. M. Noble, of Delhi, Iowa : I am aware that pulleys have been placed on pins attached to the rails of bedsteads to serve merely as friction rollers or pulleys to ease and facilitate the adjusting of sacking bottoms to bedsteads, but I am not aware that rollers have been attached to bedstead rails as shown, and a rope passed around said pulleys as described, so as to form a flexible and yielding bed bottom. I do not claim broadly, therefore, the employment or use of friction rollers.

But I cl im the pulleys, B, attached to two opposite sides or ends of the bedstead by cords, straps, or equivalent means, so as to admit of the free turning of the pulleys and the twisting of the same in planes at right angles with their plane of rotation, in combination with the rope, which is strained around the pulleys, the whole being arranged as and for the purpose set forth.

I also claim, in combination with the pulleys, B, and rope, C, the elastic bands, e, for the purpose specified.

[A series of pulleys are attached to the head and foot rails of the bedstead by means of straps or other flexible material, and a rope passes through a pulley on the head rail, and then around one on the foot rail from side to side of the bed, so that the rope forms a flexible but secure bottom. The parallel lines of rope are connected by elastic bands, and by this means a very cheap and comfortable bed bottom is obtained.]

JOURNAL BOXES—J. A. Norris, of Philadelphia, Pa. : I claim, first, The combination of the glands, D D', &c., with a box, A, having stuffing boxes formed in each end, substantially as and for the purposes described.

Second, Arranging a packing, O, between the adjacent sides of the box, as described, whereby the entrance of any dust between said sides is rendered impossible.

CLOTHES' PIN—Dexter Piercc, of Sunapee, N. H. : I claim as a new article of manufacture, to wit, a clothes' pin, all the parts of which are constructed substantially as set forth.

WASHING MACHINE—T. B. Pratt and F. Tyler, of Cleveland, Ohio : We do not claim the parts named as new, separately considered.

But we claim the fluted brake, F, when attached to yielding bearings, c c, parallel with fluted roller, E, in combination with the united open flapped and endless aprons, L K, and when arranged and operating in the manner and for the purpose set forth.

SEEDING MACHINES—A. M. Pratt, of Lowell, N. Y. : I do not claim the seed distributing device, for that is in common use and well known.

But I claim attaching the furrow and covering shares, F D, respectively to shafts, E C, which are allowed to turn in their bearings, and are connected by the rods, k l, to the lever, J, when said parts thus arranged are used in connection with the shaft, i, attached to the lever, J, crank, h, and lever, I, which support one end of the seed distributing shaft, H, the whole being arranged to operate as and for the purpose set forth.

[This is a novel arrangement of the furrow and covering shares with the seed distributing shaft, in order that the seed distributing device may be thrown out of gear simultaneously with the elevating of the furrow and covering shares, and by the movement of a single lever, so that the machine may be rendered inoperative instantaneously when required, as in passing over barren or waste spots of ground, &c.]

RAILROAD SWITCH—N. Pullman, of New Oregon, Iowa : I claim, first, The combination of the bent

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switch rail with the shoe when arranged in the manner and for the purpose set forth.

Second, The combination of the curved blocks with the shoe and the switch rail for the purpose of regulating in inclination of the switch rail to the track and also its angle of divergence from the track, substantially as described.

GOVERNOR FOR HORSE POWER—Lea Pusey, of Wilmington, Del. : I claim the loaded levers, D D', or sliding weights, provided with brakes, h, connected by a spring and rods attached to an independent rotating disk, or rotating arms, or to the fly wheel of the machine to which the device is applied, in combination with a stationary or revolving rim, K, the whole being arranged to operate as and for the purpose set forth.

[In this invention there are attached to the arms which are secured to, or project from, the fly wheel shaft, or to the fly wheel itself, loaded levers, provided with friction blocks connected by a spring rod, and fitted within a stationary rim, whereby the speed of the horse power, or other machine to which the governor is applied, may be regulated as desired, by a simple mechanical arrangement.]

WASHING MACHINE—Abraham Quimly, of Terre Haute, Ind. : I claim the combination of the approximating plungers E E, with the revolving tub, A, whereby the clothes are subjected to a continuous rotary action, and at intervals to a squeezing or expressing action, and thereby thoroughly washed, substantially as set forth.

FLOURING MILL—Christopher Rands, of Peoria, Ill. : I claim, first, The combined arrangement of the upper and lower stories, C C, reduced from their center outward to mere rim-grinding surfaces comparatively, two annular non-grinding plates F F', one or both concave, placed over the enlarged eye of the stones, and the horizontally revolving fan or blower, G, arranged intermediate between the stones, and crossing vertically the space existing between the same, so as to force the grain, with a direct action, out to the grinding surface, and to give a direct blast, substantially as and for the purposes set forth.

Second, I claim the fan when constructed with its blades radial, and situated in the specified relation to the space existing between the stones, so as to give a direct blast, for the purposes set forth.

Third, In combination with the above, the arrangement for suspending the stones, C C', consisting of rings, D, each having four axes, c c d d or e e f f, and one being arranged on the spindle of the stones, and the other between the standards of the frame, substantially as and for the purposes set forth.

Fourth, The combination of the spirally flanched revolving and sliding cylinder, friction wheels, M N, and spindle, B, substantially as and for the purposes set forth.

APPARATUS FOR DISTILLING SPIRITS OF TURPENTINE—Daniel Reid, of Washington, N. C. : I do not claim the melting and straining of the crude turpentine before its introduction to the retort.

But I claim the employment, in connection with the still, of a steam box, C, constructed with strainers, a b, of such form and capacity as to receive the barrels of crude turpentine, all substantially as and for the purposes described.

[See description in another column.]

LIFTING JACKS—Albert C. Richard, of Newtown, Conn. : I claim the standard, A, provided with screws and pinions, in combination with the traverse bar, D, and the adjustable friction rollers, M, the whole being constructed substantially as set forth.

LAMPS FOR BURNING COAL OIL, &c.—George Rimmington. of South Brooklyn, N. Y. : I claim the cap, B, formed of two parts, a b, perforated as shown, and used in connection with the two tubes, e e, the several parts being arranged relatively with each other, and applied to the lamp, so as to operate as and for the purpose set forth.

[A perforated cap formed in two parts, and used in connection with too flat wi k tubes pla ed at a suitable distance apart is used in this lamp, in order that the flame may be supplied with a sufficient quantity of oxygen to support proper combustion without the aid of a chimney. It is especially applicable to lamps in whieh coal oil is burned.]

LIFE BOAT—Albert L. Shears, of Omro, Wis. : I claim the arrangement of the sides, L L, as onstructed with the hull proper of the boat formed the air chambers, a' a', and being open below, and these sides and air chambers, combined and arranged with the scuppers and valves, in the manner and for the purpose set forth.

GAS RETORTS—I. T. Sloan, Volney Smith, Manuel Hoover, and R. M. Briggs, of Jackson, Cal. : We claim the employment, in the manufacture of gas from wood, of a cylindrical retort placed horizontally, and having a door to close the opening for the reception of material swinging upon hinges, and shutting with a staple and eye to receive a wedge, the other end being closed with a clamp and wedge.

ROCKING CHAIR AND CRADLE—Austin S. Smith, of Lawrence, Mass. : I do not claim, separately, the adjustable back, nor the adjustable foot rest, for they have been used and arranged in various ways.

But I claim the adjustable back, B, and foot rest, F, connected by the levers, G, and arranged relatively with the seat, C, as shown, and used in connection with the rockers, H H, connected to the legs, a, by the swivel sockets, j, the whole being constructed and arranged substantially as and for the purpose set forth.

[This chair is provided with rockers, attached in such a way that they can be turned from one leg to another, and this, combined with a movable back and foot rest, forms a very convenient cradle from the rocking chair.]

SEED DRILLS—John C. Stevens, of Lee, Mass. , I do not claim, broadly, the perforated and reciprocating seed slides, h, for they have been used in various machines.

But I claim connecting the bars or beams, H, to the frame of the machine by means of joints, I J, arranged as shown, to prevent the front and converging ends of the boxes from coming in contact with each other when raised, and using in connection with the bars or beams thus hinged a distributing mechanism, arranged substantially as shown, so that the distributing device will be thrown out of gear with the wheels, G, simultaneously with the elevating of the bars or beams, H, and consequently the teeth, N.

[This invention consists in having two seed boxes hinged or jointed obliquely to a frame in such a way that they may, when necessary, be raised or turned upward without interfering with one another, so that their teeth will be free from the ground; the seed boxes being also arranged relatively with the seed distributing device, so that they will be thrown in and out of gear with the driving wheels by the same movement.]

RAKING ATTACHMENT TO HARVESTERS—J. A. St. John, of Janesville, Wis. : I claim the particular means employed for operating the rakes, viz., the reciprocating slide, I, arm, J, crank, K, shaft, M, with the rakes attached, in connection with the lever, h, pinion, N, and segment, O, the whole being arranged as shown and described.

[This invention consists in the employment of a double vibrating rake, so arranged as to traverse over the platform of the harvester, and open and close at the desired points, so that the cut grain will be raked from the platform and deposited in proper gavels upon the ground.]

WRENCH—George C. Taft, of Worcester, Mass. : I do not claim a wrench having its movable jaw operated by two reversed male screws extending in opposite directions either from one another or from a rosette.

Nor do I claim a wrench in which the sliding jaw is operated by a single male sc w rosette working in a rack applied to the stationary jaw.

Nor do I claim a wrench having its sliding jaw operated by a single male screw, whose milled head enters a recess or notch made in the shank, and has a pivot extending from it and working in a step made in a projection from the handle, such being the construction of the wrench of Doring Coes, as patented April 16th, 1841. From this latter my improved wrench differs materially, inasmuch as it has two reversed male screws and its rosette, instead of being stationary in other respects than being capable of being revolved, will move endwise with the screws when they revolve. Furthermore, my improved wrench has the cylindrical slider, K, so made as not only to revolve with the male screws, but move endwise with them, and perform the function of maintaining the male screw rosette in connection with its screw rack at whatever distance the rosette may be from the projection, O. No such slider is found in Coes' wrench, because it is not necessary there, for in such there is no endwise movement of the screw, and no worm rosette and rack to be maintained in connection. Coes uses a pivot working in a cup or step, and both are so formed that no endwise motion of the pivot can take place.

But I claim a wrench provided with two reversed male screws for operating its movable jaw, arranging the lowermost screw, G, to work in a screw rack, H, on the shank, A, of the wrench, and providing the said screw with a cylind cal slider, K, extending below it, and operating so as not only to turn around, but move longitudinally with the screw, and in a socket piece, O, connected with the handle, the whole being substantially as described.

FEED REGULATOR FOR STEAM BOILERS—Leonard Thorn, of New York City : I do not claim to have invented the combination of a cock and float to regulate the supply of water to a boiler.

But I claim making the stem or arm of a hollow float, which is applied to the cock in the manner described, with a passage through it, onnecting with a passage leading through one end of the plug of the cock, and thereby forming a communication from the interior of the float to the atmosphere, for the purpose set forth.

[A full description of this invention is given in another column.]

ATTACHMENT FOR OPENING AND CLOSING DOORS, &c.—A. W. Webster, of Waterbury, Conn. : I claim the levers, D D, pivoted to the lintel, d, of the casing or sill thereof, the inner ends of the leve gearing into each other, and the outer ends connected by the arms, C, to the doors or shutters, A A, the whole being arranged substantially as and for the purpose set forth.

[To the inner side of a blind or shutter a projection is attached, to which a pin is secured; this pin is fitted in the outer end of a slotted lever, the inner end of which is of semicircular form, provided with teeth which gear into a corresponding lever and pin on another blind or shutter, so that by moving one blind or shutter, the other will be operated simultaneously in the same direction.]

PORTABLE SODA WATER APPARATUS—E. D. Wheeler, of Murfreesboro', Tenn. : I laim inclosing the charge in a long fibrous case or bag, A, when said case or bag is used in combination with a soda water apparatus constructed and operating as described.

COMPOSITION FOR ARTIFICIAL LEATHER—Samuel Whitmarsh, of Northampton, Mass. : I do not claim, broadly, the saturation of cloth and other fabrics in linseed oil containing umber or other substances.

But what I claim is the fabric specified, composed of cotton or other fibrous substance in a woven or unwoven condition saturated or coated with a compound of linseed oil and burnt umber that has been prepared as described.

[See notice on page 310.]

CHANGING ROTATING INTO RECIPROCATING MOTION—S. L. Wiegand, of Philadelphia, Pa. : I claim, first, The oblique wheel adjustable in an axis transverse to the revolving shaft.

Second, Giving a permanent lead to the motion by a permanent inclination of the wheel, A, in combination with a variable inclination.

Third, Conveying the vibratory motion to the rods by means of ball and socket or universal joints, when said joints are used in combination with the frame.

POWER AND HAND DRILLS—Horace Woodman, of Biddeford, Me. : I claim, first, Constructing an eye or box in the u pper end of the post A, in combination with the hollow shaft, B, and spindle frame, D, arranged substantially as described, whereby the spindle carried by the frame, D, may be set and operated at any required distance from an angle to the said post, A, as set forth.

Second, The combined arrangement of the hollow shaft, B, frame, D, gears, F F', and spindles, C, and G, with their projecting ends substantially as described, whereby the drill spindle may be driven either directly or through the medium of shaft, C, and bevel gears, as and for the purposes set forth.

Third, The arrangement of the movable platen or face plate, U, with the sliding clamp jaws, W, collar, V, and set screw, X, as specified.

VAPOR LAMPS—Horatio Bateman, of Boston, Mass., assignor to Wm. F. Bateman, of Harvard, Mass. : I claim constructing the spur or tongue, e, with a suitable eye for the insertion and retention of the wick, as set forth.

MACHINE FOR CUTTING PIPE—Mic ael Bowes (assignor to himself and Geo. B. Waterhouse), of Charlotte, N. C. : I claim, in combination with the cutter, the two revolving disks with the series of holes, the holes of one dish being furnished with loose sleeves or rings, for the purpose of adapting the machine to the cutting off of pipes of various sizes, as set forth.

STEAM TRAP VALVE—J. W. Hoard (assignor to himself and G. B. Wiggin), of Providence, R. I. : I claim the construction of the valve, substantially as described with a metal stem, part of which is hollow and communicates with the hollow interior of the valve, and is fitted with a hollow cap, G, which also serves as a nut to secu the valve against longitudinal expansion, whereby provision is made for filling it with liquid and confining such liquid therein.

[This invention consists in a hollow valve of india-rubber of spheri al or sphereoidal form filled with alcohol, mercury or other liquid, so applied in a cylindrical chamber at the extremity of the coil or train of steam pipe that when surrounded by a temperatu of 212 Fah. a space will be left between it and its chamber for the escape of the water of condensation from the pipe, but that when surrounded by a temperature above 212°, it will be caused by the expansion of its contained liquid by the heat, to expand laterally and close the chamber, and thus prevent the escape of the steam.]

STOVES—Charles Hoofstatter (assignor to Joseph Firman), of Rome, N. Y. : I claim the flues, H H' and H 2, and partition, J J', in connection with the ovens, I and I', when the whole are arranged in relation to each other in the manner as and for the purposes set forth.

EXTRACTING TEETH—J. B. Francis, of Philadelphia, Pa., assignor to Wm. Harper, Jr., assignor to J. B. Francis, aforesaid, assignor to Jas. J. Clark, of said Philadelphia, Pa. : I claim the combination of the electro-magnetic machine, or its equivalent, with the forceps for removing teeth without pain, arranged and operating substantially in the manner described.

KNIFE CLEANERS—Wm. Miller, of Waltham, Mass., assignor to himself and D. S. French. of Wadham's Mills, N. Y.: I am aware that knife cleaners have been constructed, in which a box is employed to hold the polishing material and deliver it to the rubbing surfaces, I therefore lay claim to no such invention.

But what I claim as an improvement in knife cleaners is the shelves, B, operating in the manner substantially as set forth.

RAILROAD CAR COUPLINGS—Allen Lapham and Danl. H. Burns, of Brooklyn, N. Y., assignors to themselves and C H. Durgin, of New York City : We are aware that automatic car couplings have been used, examples of which may be seen in the patents of D. R. Pratt, Dec. 12, 1848, and A. G. Safford, Dec. 11, 1849, and we therefore lay no claim to such.

But we claim a tilting hook and lever acting in combination, constructed substantially as described, whereby the coupling mechanism is rendered automatic and capable of being disconnected instantaneously irrespective of the tension or draft of cars, substantially as set forth and specified.

ROTARY LAST HOLDER—David Philbrick, of Manchester, N. H., (assignor to himself and Elmer Townsend, of Boston, Mass.) : I do not claim a cylindrical journal and a circumscribing socket held together not only by a groove running around the journal, but a pin or screw extending from the socket into the groove.

Nor do I claim attaching the radial arm to a revolving plate held to the circular face of a support or standard by a clamp.

But what I claim is, my improved support piece of the radial arm, viz., as made of a standard and plate, K, recessed as specified, and a circular plate, I, formed to enter the recess of the plate, K, and to make with such a dove-tailed groove or its equivalent for receiving the head of the clamp screw, L, the two plates being confined together by a screw and nut constructed and operating as and for the purpose set forth.

I also claim the improved last holder. hinge, and clamp as made essentially as above described, viz., with its clamping and hinge pin, constructed with a head to bear against one end of the male part of the hinge and to turn and be supported in one of the prongs of the fork of the hinge as explained.

HARVESTERS—Wm. H. Seymour and Henry Pease, (assignors to Wm. H. Seymour and Dayton S. Morgan,) of Brockfort, N. Y.: We do not claim hinging the tongue to the frame of the machine, nor supporting it between guides, nor raising and lowering the cutter by elevating and depressing the rear end of the tongue when the latter is combined with a lever, screw, windlass, or other similar contrivance to aid the attendent of the machine in raising and lowering the end of the tongue.

But we claim the arrangement of the tongue on a pivot in advance of the cutter, and in a guide, provided with a detent, in rear of the cutter, the whole being arranged as described, so that the attendant can conveniently and readily by means of the link raise the cutter by lifting directly the rear end of the tongue as set forth.

CASTING FAUCETS—Oliver F. Wood, of Pittsburgh, (assignor to Thomas R. Wood, of Philadelphia,) Pa.: I do not claim as novel the faucets in themselves considered, or as new articles of manufacture.

But I claim constructing the faucets by placing the spigots within a mold formed for the tubes of the faucets and casting the tubes around the spigots substantially as shown and described.

[This invention consists in placing the spigot of the faucet within a mold which is formed for casting the body or tube of the faucet, so that the body or tube of the faucet may be cast around the spigot, and the latter thereby fitted accurately in place without any after-work or finishing whatever, the spigot being properly finished before being placed in the mold.]

RAILROAD BRAKES—Joseph Harris of Alleghany, Pa.: I claim, first, the combination of the cross arms, on each of several cars, with a chain shaft on one car connected as described by chains, rods, or ropes for the purpose of adjusting and operating the brakes in the manner substantially as set forth.

Second, The combination of the tumbler, h, with the extension shafts, f f, the purchase rods, m m, and springs, s s, to act automatically as a railroad brake—substantially in the manner described.

RE-ISSUES.

CUTTING DEVICE FOR HARVESTERS—Henry Green, of Ottawa, Ill. Patent March 21, 1854. Ante-dated Sept. 21, 1853 : I claim placing the blade or the cutting teeth of a harvesting machine on the vibrating bar to which they are secured so that the said blade or cutting teeth may extend back and behind such bar substantially in the manner and for the purpose specified.

MOWING MACHINES—Henry Green, of Ottawa, Ill. Patented March 21, 1854. Ante-dated Sept. 21, 1853 : I claim, first, a cutting apparatus behind the driving wheel of a machine adapted to mowing when this is combined with a tongue or pole hinged substantially as described and with proper means substantially such as described, for causing the cutting apparatus to run in close proximity with the ground, the whole combination being substantially such as and for the purposes set forth.

I also claim arranging and combining the finger beam with the rear end of the main frame of the gearing in such manner that while the portion of the finger beam to which the cutting apparatus is secured, extends below the frame, and may run close to the ground, the rear end of the frame will be car ed above the stubble, and this relative position of the rear end of the frame, of the finger beam, and of the ground, will not be disturbed by the rising and falling of the finger beam, or of the driving wheel to follow inequalities in the surface of the ground in their respective paths.

And third, I claim the combination and arrangement of a metallic shoe substantially such as described, the finger beam, and gearing frame, substantially as set forth.

REEL SUPPORTS IN MOWING MACHINES—Henry Green, of Ottawa, Ill. Patented March 21, 1854. Ante-dated Sept. 21, 1853 : I claim in machines adapted to mowing the method of supporting the reel upon the end of the finger beam without, obstructing the action of the divider, by means of inclined arms, substantially as described.

CUTTING DEVICE FOR HARVESTERS—Henry Green, of Ottawa, Ill. Patented March 21, 1854. Ante-dated Sept. 21, 1853. I claim, first, a vibrating cutter having a proper form of cutting edge in front and notched or indented in the rear thereof in combination with guard fingers across which it vibrates, substantially as set forth.

Second, The combination of a cutting edge at the front of a vibrating cutter, for severing the stocks of grass or grain, with a cutting edge at the rear for cutting up and facilitating the discharge of obstructing matter substantially as set forth.

DESIGNS.

SET OF PRINTING TYPE—George Bruce, of New York City.

TOWEL STANDS—Nathaniel Waterman, of Boston, Mass.

Statistics of Population in Scotland.

The returns of births, marriages, and deaths in Scotland for 1857, just published, show that one birth in every 29, one death in every 49, and one marriage in every 143 of its inhabitants has taken place. The birth rate, which was thus, 338 for every 10,000 of the population in Scotland, was, in the same year, 343 for every 10,000 in England. So far as a three years' average can determine such a point, it would appear that the mean mortality in Scotland has been in the proportion of 200 deaths to every 10,000 persons living, whereas in England the proportion of deaths during the same year has been 216 to every 10,000 living—producing a deficiency on the part of England of 91,259 lives in the three years. In Scotland, the inhabitants of towns were cut off during the year at the rate of 244 in every 10,000 persons, or one death in every 41; whereas in the rural districts the proportion was only 157 deaths in 10,000 persons, or one death in 63. The proportion of marriages is considerably below the ten years' average in England, the former showing only 69 marriages in every 10,000 persons, and the latter 84. This fact, and the circumstance that the returns show the number of illegitimate births to be greater, would seem to indicate that some causes are in operation which are not favorable to the morals of the population in Scotland.

Inter-oceanic Canal to the Pacific.

Lieut. T. A. Craven, U. S. N., has made a report in reference to the practibility of an inter-oceanic communication from the gulf of Darien to the Pacific ocean, by the Atrato and Troando rivers, in which, after giving full details of his late survey, he thus briefly sums up the actual physical difficulties to be overcome in cutting the proposed canal :—

"1. A cut through some five miles of submerged mud at the mouth of the river, with the prospective certainty of constant dredging to keep it open.

2. The Herculean labor and incalculable expense of cutting through the lagoons of the Truando, and the embedded logs of the Paios Caides, where the whole country is inundated during at least nine months of the year, and where the floods of a day may destroy the work of a week.

3. The vast expense attending the removal of basaltic rock, in a country where labor and provisions must all be imported at most extravagant rates.

4. The want of an anchorage on the Pacific coast.

5. The fatal effects of the climate, which, it may be safely estimated, will disable at least one-third of any force that may be sent there.

You will not be surprised that, with the preceding arguments, I am of the opinion that the proposed canal is impracticable, as involving an expenditure of treasure not easily estimated, and a sacrifice of life from which the stoutest heart may shrink. Human perseverance and ingenuity may, it is true, overcome the obstacles enumerated; but at least two generations must pass away ere the world can realize the accomplishment of a much less extensive work than that contemplated."

Great Success.

It will be noticed by reference to the official list as it is published in this number, that there were issued from the Patent Office last week eighty-seven patents.

Of this number *thirty-two* were granted to inventors whose papers were prepared and presented through the SCIENTIFIC AMERICAN Patent Agency. Inventors who have business of this character to transact will need no other assurance than the above, that what cannot be successfully accomplished through us will scarcely be worth contending for. The scrutiny and care with which our cases are examined before the application is made for the patent, and the attention paid to prosecuting rejected claims, inspire inventors generally with full confidence that whenever an invention is novel and entitled to a patent, it is sure of success in our hands.

We do not expect and do not ask for protection for any improvement unless it is new, and by careful examination into our cases we are able to report unfavorably upon more than one-half of those that are presented to us, without incurring the expense of an application. Circulars of advice sent free of charge.

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New Inventions.

Alloy for Journal Boxes.

The following is a recipe for composition metal used by A. H. Landphere, of Union, Wis., who assures us it is superior to what is known by the name of "Babbitt metal":—One pound of antimony and ten pounds of lead melted together, and run into journal boxes.

Dyes from Coal Tar Products.

Four years ago, F. Grace Calvert, an eminent English chemist, made the extraordinary statement before the Society of Arts that "ere long, some valuable dyeing substances would be prepared from coal." A few weeks ago he stood up before the same society in London, to demonstrate the truth of the above expression, by showing them a beautiful purpleish blue color, rivaling that of orchil, and having the great advantage over it of not being destroyed by light. These colors, for there are many of them, have been prepared from the alkalies of coal tar by Messrs. W. Perkins and A. H. Church, two rising discoverers, and have been called by them nitroso-phenyline and nitroso-naphthyline, &c. The colors have been tried on silk, and found perfectly fast. Mr. Perkins' process is as follows:—He dissolves in water the sulphates of aniline, of cuminine, and of toluidine, and adds sufficient bichromate of potash to neutralize the sulphuric acid in these sulphates. The whole is left to stand for twelve hours, when a brown substance is precipitated, which is washed with coal tar naphtha, and then dissolved in methylated spirits. This solution, with the addition of a little tartaric oxalic acid, forms the dyeing liquor of Mr. Perkins.

Messrs. Grace Calvert and Charles Lowe have prepared from coal tar products of a most extraordinary dyeing power, and yielding colors nearly as beautiful as safflower pinks and cochineal crimsons; and what enhances the value of the discovery is, that upon cloth colored with them, all the varieties of shades and colors given by madder are obtained—violet, purple, chocolate, pink, and red. These colors stand light and soap, which the originals, safflower colors, do not. The processes by which these wonders of chemical art are manufactured are not yet known; but we shall look carefully for them, and give them to our readers. Just imagine a crimson silk handkerchief dyed with a piece of coal!

Improved Furnace.

The great difficulty attending the successful burning of such refuse fuel as cannot be burned on a grate but has to be consumed on a hearth, is to introduce sufficient air into the material as will supply oxygen enough to consume all the carbon of the substance.

The furnace represented in our illustrations is intended to overcome this difficulty; and the peculiar construction of it for this purpose will be understood from the following description.

Fig. 1 is a sectional elevation of the furnace, and Fig. 2 is a horizontal section.

H is a cylindrical fire-place or furnace, having vertical sides up to a certain point, from which rises a dome-shaped top. From the cylindrical furnace a number of angular projections, B′, are built inside, and through these passes the air conduit or space, G, communicating with the external air, as seen in Fig. 1. This is divided into three draft passages, C C B, as seen in Fig. 2, and thus supplies air at three different portions of each angular projection. To each of the passages, G, there is a damper, *g*, which enables the air to be supplied into the center of a cone, E, and from that to be distributed by four draft or supply passages, E′, right into the center of the burning mass. There are a series of openings in the furnace wall, A, which can be closed with doors, and are used for looking into the furnace to see how the operation is going on. There are also openings for cleaning the hearth of the furnace and exhausting the ashes.

On a support, *a*, rests the boiler, and under it the heated products of combustion pass, giving up their heat to it on their way to the chimney, F. There is a transverse bridge, *b*, in the flue, and some side bridges *e′*, are erected on an arch that crosses the flue, so dividing the flue into two parts horizontally, *d* being the lower passage.

The operation is as follows:—The fuel being fed through the hopper, I, by means of a feeder, J, and the fire lighted, the external air coming through the passages, G, becomes heated, and so is admitted to the fuel at a temperature conducive to promoting combustion, and besides it being admitted in so many places, every portion of the fuel has a chance of being burned. The heated products of combustion pass through the flue, D, and over the bridge, *b*, giving up their heat to the boiler, and also in the direction of the arrows in Fig. 2, around the side bridges, *e′*, so that no heat may be lost. There is a damper, *f*, at the side of the chimney, which directs the gases through the side bridges, *e′*, or under them, through the passage, *d*, into the chimney, F.

This is an excellently contrived furnace, and is the invention of Evan Skelly, of Plaquemine, Iberville Parish, La. He has applied for a patent, and will be happy to give any further information upon being addressed as above.

SKELLY'S BAGASSE FURNACE.

Fig. 1

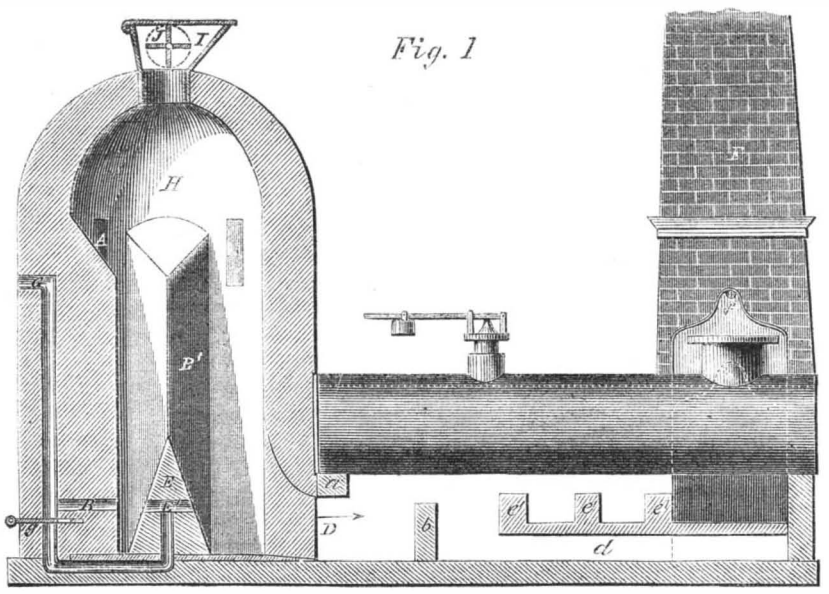
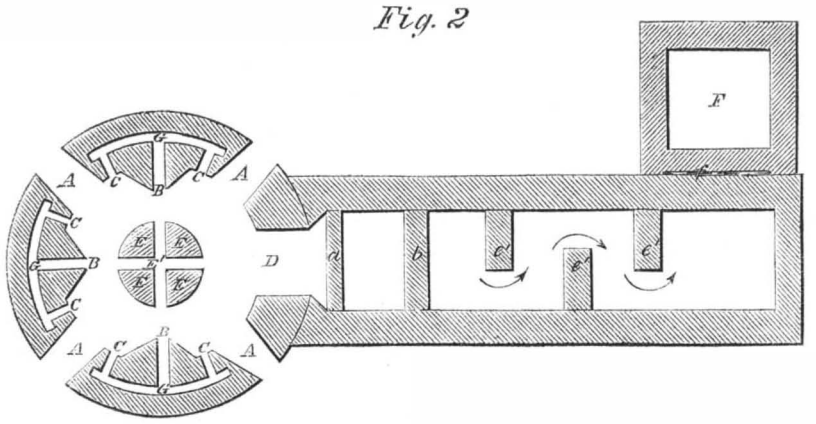


Fig. 2



BARROWS' SELF-REGULATING DAMPER FOR HOT AIR FURNACE FLUES.

Fig. 1

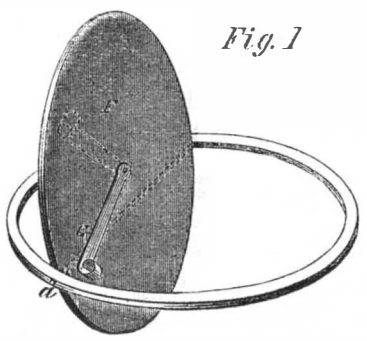
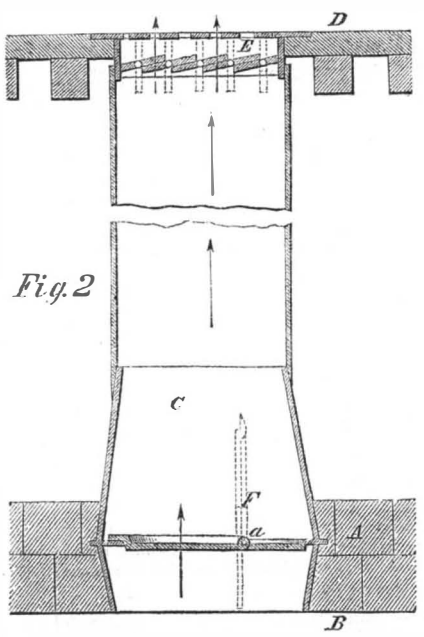


Fig. 2



A great objection to the use and adoption of air-heating furnaces is that the hot air conducting pipes are very liable to become overheated when the registers are closed; and from this cause many serious accidents have occurred, the adjacent wood-work taking fire, and thus inflaming, and perhaps destroying much valuable property. The object of this invention is to prevent the pipes becoming heated, by providing them with a self-regulating damper, so that when the register of the pipes is closed, and the draught through them consequently stopped, the dampers will close by their own gravity, and shut off the pipes from the air-heating chamber; and when the registers are fully, or more or less open, the dampers will be opened to a corresponding degree by the action of the draught.

Fig. 1 is a perspective view of one of these dampers, separated from the pipe. A circular plate, F, forms the damper; and it is suspended by an axis, *a*, which is a little to one side of the center, in a ring; an adjustable balance, G, is added, so that nearly an equipoise may always be maintained. Fig. 2 illustrates the application of this damper to the air-conducting pipe. A, represents a portion of the upper part of the masonry which encloses a hot air furnace to form the air-heating chamber, B, and C is a hot air conducting pipe, the lower end of which communicates with the air-heating chamber, B, and the upper end is connected to the register, E, in the floor of an apartment, D. F is the valve or damper before described, so weighted that it is nearly balanced; but it is still sufficiently preponderant on the larger side as to allow it always to close by gravity, and at the same time to open with a slight draft.

From this description it will be seen that when the registers, E, are closed, the damper closes itself, and all communication between the chamber and the pipe is stopped; but when the register is opened to the position indicated by the dotted lines, the current of hot air (shown by the arrows) also opens the damper, F, to the position indicated by dotted lines also, and the room is filled with warm air.

This simple and ingenious contrivance is the invention of Mr. Ebenezer Barrows, No. 228 Water street, New York, and a patent was granted for it March 23, 1858. It can be attached to any furnace with little trouble, and will form a safe and valuable addition.

The inventor will give any further information upon being addressed at the furnace and range depot, E. Barrows, Sons, 228 Water st., New York.

Patent Case Decided.

The sewing machine interference case, upon which the parties have been taking testimony for six months or more, between the application of Wm. C. Watson, manufacturer of the "Ten Dollar Sewing Machine," and the patents of A. B. Wilson, held by the Wheeler & Wilson Manufacturing Company, the Grover & Baker Sewing Machine Company, and I. M. Singer & Co., was decided last week by the Commissioner of Patents in favor of the latter, thereby establishing their exclusive right to the "rough surface and spring pressure feed" in combination.—*New York Tribune.*

[To prevent misapprehension we would state that the facts in the above case, as we understand them, are simply these:—W. C. Watson, believing that he could prove a prior date of invention over A. B. Wilson, applied for a patent on the spring pressure feed, and obtained a declaration of interference. Testimony as to date of invention was then taken upon both sides. The Commissioner of Patents, upon an examination of the testimony, decides that Watson has failed to establish his priority of invention and his application for a patent is accordingly rejected. But there is nothing in this decision which establishes the "exclusive right" of the above-named wealthy firms. Questions of this latter character are beyond the province of the Commissioner, being left to the courts for adjudication.

Iron Bridge over the Nile.

A great tubular iron bridge is now being constructed at Newcastle, England, and will be completed in about two years, for the Egyptian Railroad, which crosses the Nile about midway between Cairo and Alexandria. The river there is 1,100 feet wide, and a steam ferry boat is now employed to do the business. It does not suit the go-ahead spirit of the Pasha. He was once detained for four hours in crossing by an accident to the boat, and he then gave Robert Stephenson orders to build this bridge.

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Scientific American.

NEW YORK, JUNE 5, 1858.

Vehicles of Paints.

Oil is the common vehicle employed for paints, and it is undoubtedly the best; it has, however, some defects requiring correctives. Thus drying linseed oil, which is made by boiling it with some metallic oxyd, &c., has such an affinity for oxygen as to promote chemical uuion with it and the coloring pigments, and thusultimately destroy the beauty of their color. There are many delicate and beautiful colored pigments which cannot be employed with oil in paint, without suffering injury. This is the case with chrome yellow, verdigris, gamboge, and a number of the lakes. But there is a very useful corrective for this deteriorating quality of the oil, that is pure beeswax. It was the principle vehicle of the ancient painters before oil painting was invented, and some of the old paintings exhibit a freshness of color perfectly wonderful. Wax is a powerful antiseptic, has great preservative powers, and it would be well to apply it as the first coating for canvas designed for oil paintings. Wax added to painters' varnishes tends to prevent them cracking, the latter being an evil which has destroyed the beauty of many excellent works of art. It is said that the famous Titian painted on a red ground, and imbued his canvas at the back with beeswax dissolved in oil; this may account in a measure for the enduring brilliancy of his colors. It has also been asserted on the other hand that Sir Joshua Reynolds used a great deal of wax with his colors, and it is well known that their beauty has been very short lived, and his paintings have all become very faint. But it has also been denied that he used wax as a vehicle, because it is the most unalterable of unctuous bodies, and would have preserved his colors. Bleached wax is easily dissolved in hot oils, both volatile and fixed; it is not changed by exposure to the atmosphere, and is but very feebly acted upon by the strongest acids. Its appropriateness, therefore, as a vehicle for paints is self-evident.

Oils contain a considerable portion of glycerine, which is a hygroscopic fat, and prevents unprepared oils from drying. It has been found that some metallic oxyds possess the quality of combining with the glycerine in the oil, and rendering it susceptible of readily drying in the atmosphere. The oxyd of lead, sulphate of zinc, and the oxyd of manganese, boiled with oils, communicate to them great drying properties, and for this reason oils treated in this manner are called *drying oils*, and are in common use.

Some works written by incapable authors recommend the use of both sulphate of zinc and the acetate of lead mixed together for making drying oil. These two metallic salts when brought together produce two new compounds by double decomposition, namely, the acetate of zinc and the sulphate of lead, and the oil is restored to its original condition. The acetate of zinc should never be employed in paints, because it is a bad drier. Few painters, we suppose, are aware of the foregoing action.

Fixed oils, even those which are bleached, when exposed to the air become rancid, yellow, and acquire an acid reaction. They absorb oxygen from several pigments, but this, in a great measure, is prevented by the use of wax or a little resin, such as gum shellac. Many persons mix shellac varnish with common paint in order to render the latter less expensive, because a considerable quantity of water can be added to the varnish and combined with the paint owing to the alkaline agent employed to dissolve the gum. Thus, if we take three ounces of the bi-carbonate of soda, and place it in three pints of soft water, it will dissolve a pound of gum shellac by boiling, thus making a lac varnish. To this is usually added half a pint of alcohol and two quarts of soft water, and it is then mixed with common oil paint. For inside work in houses it will answer well, but it should never be applied to the outside of buildings, because it cannot resist atmospheric influences like paint which contains only boiled oil and a pigment. Gum shellac varnish made with the carbonate of soda does not stand the action of rain so well as shellac varnish for which alcohol has been employed as a solvent. It should, therefore, never be used for any work exposed to water or the weather.

San Francisco Mechanics' Institute.

The second Industrial Exhibition of the above Institute will be held on the first of September next, and will continue open for fifteen days. The State Horticultural Society will also hold its second annual exhibition in conjunction with the Institute, and thus the California mechanic and agriculturist—twin brothers in the useful arts—will stand, as they always should, on the same platform.

The San Francisco Mechanics' Institute is a spirited and flourishing association, and we think it will do a great and noble work for California, as the prosperity of any State depends chiefly on the character and number of its mechanics. They fabricate the engines, machines, and implements by which agriculture, commerce, and all the useful arts are conducted and carried on.

——"By hammer and hand
All trades do stand."

Prosperity always attends a nation in which the mechanic arts flourish. Wherever the mechanics are in a low condition, the mass of the people sink to the same level; a general poverty, at least, is always the consequence. Turn our eyes to whatever quarter of the world we may, and these assertions will be fully borne out by the condition of the various peoples inhabiting our globe. Those, therefore, who are engaged in the mechanics' institutes and other kindred societies, are doing a noble work for their country and fellow men in their endeavors to raise the dignity of their callings, and to render the mechanic arts respectable and flourishing.

At the exhibition of the above institution held last year, the secretary, Mr. H. F. Williams, delivered an able address, from which we glean some instructive statistics in reference to the progress of California, a few of which we shall present:—

In 1850, the entire area of land under cultivation in California was only 5,000 acres; in 1856 it had increased to 500,000; 17,000 bushels of wheat were raised in 1850—in 1856, 4,000,000. In the latter year 2,000,000 gallons of native wines were made, and other agricultural products were raised in equal proportions. California is fast becoming a great agricultural State, and now exports wheat.

In 1850, there were only 25 mills in the Golden State; in 1856 there were 500, exclusive of the quartz mills. There are now over 130 grist and 370 saw mills. The flour mills can turn out 2,000,000 barrels annually, and the saw mills 500,000,000 feet of lumber in the same time. Both flour and lumber were exported last year to the value of $1,000,000. There are 14 foundries, and a large number of machine shops in San Francisco in successful operation; and engines, boilers, quartz machines, and almost all other kinds of machinery are now manufactured extensively. A considerable quantity of furniture is also made from the native woods, some of which are very beautiful, and eminently adapted for cabinet work. A sugar refinery and soap factory have been erected; but although $4,000,000 worth of hides are annually exported from thence, no tannery has yet been put in operation; and yet $20,000,000 are yearly paid for imported boots and shoes.

The early history of California is filled with scenes of debauchery and crime. The majority of the early adventurers went there solely to make money in any way, not to make that land their home. Some of the noble spirits who then went out, and who, in the exhibition of high moral principles, refused to gamble and carouse, and were scouted and sneered at, are now all the more highly honored because of their moral steadfastness amid so many temptations. Of late years, a very respectable class of yeomen and mechanics' families have gone thither, to make it their future abode. The valleys of the golden land are now beginning to smile with peace and plenty; the church and the school-house—those necessary adjuncts of morality and civilization—are to be seen in every village. California is, perhaps, yet destined to be the greatest State of the Republic.

The Great Astronomical Experiment.

A few years ago, some members of the Royal Institution of Great Britain, after regretting the limited sphere of man's vision, and only feeling, from the telescope's revelations, an intense desire to know more of the universe, and a wish to dive deeper into the realms of space, suggested that could a telescope be placed at a great elevation, say 10,000 feet above the level of the sea, the observer would be able to scan a greater distance than had ever been seen before. In accordance with this suggestion, Professor C. Piazzi Smyth, Astronomer Royal for Scotland, amply provided with instruments, went to the Peak of Teneriffe, and the history of his observations he has just made known. R. Stephenson, Esq., kindly lent the Professor his yacht *Titania*; and under the auspices of the Lords of the Admiralty, and with the advice of Mr. Airy, and the good wishes of all, the little expedition left Cowes, June 22, 1856, and arrived at Teneriffe July 8th. Professor Smyth was accompanied by his wife, and a better assistant no astronomer ever had. They bivouacked on the top of Mount Guajara, 8,900 feet high, where the air was always calm, the temperature averaging 65°, far above all clouds, and under a sky gloriously resplendent with stars.

"A great plain of vapor," we use the Professor's own words, "floated in mid-air, at a hight of 4,000 feet, and separated many things from our vision. Beneath were a moist atmosphere, fruits, and gardens, and the abodes of man; above, an air inconceivably dry, in which the bare bones of the great mountain lay, oxydizing in all the variety of brilliant colors in the light of the sun by day and stars innumerable at night."

The air was so clear that a star which only appeared of the 10th magnitude on the sea level, was one of the 14th from that height of observation.

One thing has been clearly proved by this gentleman's observations, namely, that the most accurate observations can be made at a great hight, and that the penetrative power of the telescope is increased in the higher and dryer regions of the atmosphere. Sir Isaac Newton prophesied this fact, but it remained for the astronomers of the present day to test and prove the truth of the hypothesis, and as a result, we have no doubt but that an observatory will be established on Teneriffe by some people or nation. We should like such a place to be cosmopolitan—open to the astronomers of the world; for the stars shine alike on all men, and know no distinctions of flags or nationalities. They teach their lessons to all who will learn, and fill the immensity of space through which all nations roll.

How to Run a Boundary.

In the Senate at Washington, on the 18th ult., some discussion took place upon this subject, and an amendment was proposed, which provided that no persons but those who were actually necessary to the taking and registering of measurements, &c., should accompany the expedition. Mr. Houston, in a humorous speech, expressed his sentiments upon the subject of scientific men accompanying such expeditions. He said: "The catching of a single bug of rare quality immortalizes a scientific gentleman, and a lizard or a horned frog confers double immortality"—from which he deduced that these gentlemen have their own aggrandizement more at heart than the purposes of the expedition. This may be very true; but when a new country is explored, it is necessary that astronomers should visit it, that the world may be informed of the astral peculiarities; its geology and natural history should be described; and more than all, its physical geography is important. To discover these facts, and to arrange them intelligently, scientific men must visit the place; and it is a very false economy on the part of any government not to give them all the aid they require. In many climates insects eat up a crop before its maturity, and so cause a famine; and if by a scientific man this insect can be discovered and killed, "the catching of a single bug" may not only immortalize the catcher, but also benefit a whole community. We say, support scientific explorations, for there are people in the world who see more than pictures in the books published by Uncle Sam, and who regard them with more interest than giving them to amuse children.

Ericsson on the Atlantic Cable Machinery.

Capt. Ericsson has addressed a letter to the Editor of the New York Daily *Times*, on the above subject, and it has attracted some public attention. He labors under misinformation regarding the machinery which has been adopted for paying out the cable. He asserts that it does not embrace devices or arrangements to prevent jerks and strains upon the cable while the vessel rises and sinks in a heavy sea. Were this the case the machinery would be defective indeed.

He proposes an arrangement to meet the difficulty mentioned, by passing the cable over a traveling sheave, which is to run back and forth, to pay out the increased slack of cable required, when the stern of the vessel rises, and vice versa. The Atlantic telegraph company have adopted this very feature in their machinery for paying out the cable, but it is not the invention of their engineers. It was patented by H. Berdan of this city, as stated by us on page 293, and his model with such an arrangement was exhibited in our office, as far back as November, 1857, and in the Merchants' Exchange, this city, in February last, in which month it was sent to England.

It was not, until a considerable period subsequent to the exhibition of this model, that we heard of any other person proposing such a necessary compensating arrangement for paying out the Atlantic cable. The only mechanical difference between the arrangement proposed by Capt. Ericsson, and that embraced in Mr. Berdan's model, is that the latter has a traveling carriage, instead of a single traveling sheave, and he employs a tension weight, instead of steam, or compressed air, which Capt. Ericsson proposes for the same purpose, but the principle of the invention is the same. The machinery to be employed by the Telegraph company, is Berdan's turned upside down, which embraces about as much difference in principle, as making the hammer of a gun strike upwards, instead of downwards, and which the infringer of Forsyth's patent, had the audacity to represent before a Court, as a different invention from the percussion lock, because the latter was represented in the patent with its hammer downward. "Honor to whom honor is due."

Just as we were going to press we received a letter from Capt. Ericsson, in which he states that a friend had directed his attention to an article on page 293 of the present volume of the SCIENTIFIC AMERICAN, subsequent to the publication of his letter above referred to. Of course, had he seen our article, he would not have written the letter to the *Times*.

Death of a Spanish Savant.

M. Adrien Paillette, who has been for many years civil engineer to the Queen of Spain, died recently at the age of forty-nine. He was a first-rate metallurgist, and has constructed some immense works calculated to develop the mineral resources of the country. Numbers of decorations were conferred upon him by the Courts of Europe for his acquirements and learning.

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Alloys of Metals.

Much has yet to be learned regarding the alloys of metals, because a very small difference in the proportions of the metals employed produces a great difference in the quality of the alloy sought to be obtained. A very interesting paper on this subject (as published in the London *Engineer*) has recently been communicated to the Manchester (England) Philosophical Society, by F. Grace Calvert, F.C.S., and R. Johnson. The object of the authors of this paper was to present something reliable and useful regarding the *hardness* of alloys. The process at present adopted for determining the comparative hardness of bodies consists in rubbing one against another, and the one which scratches is held to be the hardest. Thus, for example, when diamond is rubbed against glass, it is found that the former scratches the latter, hence the diamond is justly held to be the hardest. Every person is familiar with regard to the comparative hardness of these two bodies, but very few are acquainted with the comparative hardness of other bodies, especially metals and their alloys, although a scale of hardness has long been adopted among mineralogists.

Messrs. Calvert and Johnson made a series of experiments with pretty large masses of metal to test their comparative hardness; and the following is a most useful table which has been prepared, embracing the results of their investigations :—

Names of Metals.	*Hardness.*
Cast Iron,	1·000,
Steel,	——,
Wrought Iron,	·948,
Platinum,	·375,
Pure Copper,	·301,
Aluminum,	·271,
Silver,	208,
Zinc,	·183,
Gold,	·167,
Cadmium,	·108,
Bismuth,	·52,
Tin,	·27,
Lead,	·10.

This table exhibits the remarkable fact that cast iron is harder than all the other metals; it was found to be harder than any alloy. Its great resistance to a crushing force—on account of its cohesion and hardness—is well known; hence its superiority for the pillars and walls of buildings, and the journal boxes of heavy stationary shafting—the latter, however, should always be lined with a soft antifriction alloy.

It was found that some brasses were harder than any of the metals composing them, and strange to relate, this hardness is due to the softer metal—the zinc. Thus an alloy of zinc 50, copper 49, was in hardness as compared with cast iron ·604; while an alloy of copper 66, zinc 33, was only ·472 in hardness. The fact was also eliminated that when the quantity of zinc much exceeded 50 per cent of the copper, the brass produced was very brittle. A beautiful brass composed of zinc 50·68, copper 49·32, was made. It contains about 20 per cent more zinc than the brasses of commerce, and yet when carefully prepared it is richer in color, which renders it superior, for many purposes, to commercial brass, also on account of the softness of the latter. We hope American pin manufacturers will take this as a useful hint, because the pins which they now make, although much cheaper than the old "London pins," are far inferior in the quality of metal; they do not seem to have any strength—they bend like a piece of lead wire.

The common alloys employed for making journal boxes are much dearer than a brass composed of zinc 50, and copper 50, and yet they are no harder. For heavy bearing boxes an alloy of copper 82·05, tin 12·82, zinc 5·13, is common. Its hardness is ·562 as compared with cast iron at 1,000, and is lower than the brass of ·604 hardness, yet its cost is at least three times greater.

In a series of bronze alloys containing tin and copper, it was found that an excess of tin was the cause of softness, while an excess of copper, although it is such a malleable metal, is the cause of brittleness. Thus an alloy of 21·21 copper, and 78·79 tin, is not brittle; but an alloy of 34·98 copper, and 65·02 tin is very brittle. When the copper is increased to make an alloy of 84·68 copper, and 15·32 tin, the brittleness is removed, and the alloy is very hard; it is as compared with cast iron at 1,000, ·916 in hardness. A composition of 9·73 copper, and 90·27 tin, is very soft, being only ·83 as compared with cast iron.

An excess of zinc in brass increases its hardness, while the very opposite result would be expected, because zinc is softer than copper. In alloys of copper and tin—common bronze—an excess of tin renders the alloy soft, as would be expected, because it is the softer metal. On the other hand, an increased quantity of copper—from but one-third to that of the quantity of tin in the bronze, up until it (the copper) is four times the quantity of tin—renders the alloy brittle, a result which would not be expected, judging from the nature of the metals in their simple conditions.

Regarding the quality of alloys of all kinds, much, undoubtedly, depends on the mode of mixing them; such as the length of time they are kept at a smelting heat, and the length of time in cooling them. Copper is rendered hard by slow cooling, and soft by rapid cooling, while iron possesses the very opposite qualities.

Alloys containing copper generally contract and become of greater specific gravity. An amalgam of mercury and tin expands, as do nearly all amalgams. The following binary alloys also expand, namely: bismuth and zinc; bismuth and antimony; lead and tin, and lead and antimony. Therefore these alloys should take the sharp outline of molds, and be eminently adapted for casting small ornaments.

Steam Fire Engines for Washington.

On the 25th ult. a bill was passed in the House of Representatives for organizing a paid fire department for the city of Washington, and appropriating $37,000 for the purchase of steam fire engines, and a fire and police telegraph. Here is a chance for the builders of steam fire engines. But like most all government jobs, we suppose the contract for these machines will be obtained upon the strength of political influence, not mechanical merit.

The Amount of Food Consumed by a man During his Lifetime.

M. Alexis Soyer, the celebrated professor of the gastronomic art, entered into a calculation, which he published in the London *Times*, as to the amount of flesh, fowl and fish eaten by a man in an average lifetime, and among the items we find the following enormous quantities :—

30 oxen, 200 sheep, 100 calves, 200 lambs, 50 pigs; in poultry, 1,200 fowls, 300 turkeys, 150 geese, 400 ducklings, 263 pigeons; 1,400 partridges, pheasants and grouse, 600 woodcock and snipe, 600 wild pigeons and teal; 450 plovers, ruffs, and reeves; 800 quails, ortolan and dotterills, and a few guillemots and other foreign birds; also 500 hares and rabbits, 40 deer, 120 guinea fowl, 10 peacocks, and 360 wild fowl. In the way of fish, 120 turbot, 140 salmon, 120 cod, 260 trout, 400 mackerel, 300 whitings, 800 soles and slips, 400 flounders, 400 red mullet, 200 eels, 150 haddock, 400 herrings, and 5,000 smelts; and some hundred thousands of those delicious silvery whitebait, besides a few hundred species of fresh water fishes. In shellfish, 20 turtle, 30,000 oysters, 1,500 lobsters or crabs, 300,000 prawns, shrimps, sardines, and anchovies.

Humming Birds' Tongues.

The tongue of a humming bird is very curious. It has two tubes alongside of each other, like the two tubes of a double-barreled gun. At the tip of the tongue the tubes are a little separated, and their ends are shaped like spoons. The honey is spooned up, as we may say, and then it is drawn into the mouth through the long tubes of the tongue. But the bird uses its tongue another way. It catches insects with it, for it lives on these as well as on honey. It catches them in this way: the two spoons grasp the insect like a pair of tongs, and the tongue bending, puts it into the bird's mouth. The tongue, then, of the humming bird is not merely one instrument, but it contains several instruments together—two pumps, two spoons, and a pair of tongs.

Recent Patented Improvements.

The following inventions have been patented this week, as will be found by referring to our List of Claims :—

Saw Grinding Apparatus—The object of this invention (which has been patented in England as well as in the United States) is to grind circular saws to a uniform thickness and with their faces perfectly even or free from the wavy appearance so frequently produced by some of the methods of grinding heretofore practiced, and to finish them perfectly to the center or eye. The invention consists in grinding the one side of a saw at a time, while the opposite side is supported by a roll which has a rotary motion at the requisite speed to cause the revolution of the saw as desired. A rotating friction clamp is applied to the saw during the grinding process in such a manner that it derives rotary motion from the saw through the agency of friction, and by the momentum acquired by such rotary motion, is caused to control and render uniform the velocity of rotation of the saw, notwithstanding any difference in the thickness of the saw plate, and consequent tendency to variation in the action of the feed roll, or other feeding contrivance upon the thicker and thinner portions of the plate. The saw is arranged to rotate in and during the grinding process upon a flat pivot, which is of sufficient width in one direction to fill the eye of the saw and steady the same as it rotates, and this is thin enough in a transverse direction to permit the grindstone to operate over the whole surface of the saw. W. Clemson, of East Woburn, Mass., is the inventor.

Boiler Feed Regulator.—The kind of regulator to which this invention relates, consists of a cock in the feed pipe at or near its junction with the boiler, and an attached float resting on the surface of the water in the boiler, and operating to open and close the passage through the cock as the level of the water in the boiler varies, for the purpose of admitting or shutting off the supply of water. The cock and float constitute the whole apparatus for feeding a boiler for heating purposes, of so low a pressure that the pressure of water in the supply pipes of cities or the head in an elevated reservoir is sufficient to force in the water, but when the water has to be pumped into the boiler, the inventor generally attaches a lever to the cock to start the feed pump when more water is required in the boiler. The improvement of this inventor—Leonard Thorn, of New York—consists in the peculiar manner of combining the float with the cock, whereby the regulator is made of simple construction and very efficient.

Substitute for Leather.—Samuel Whitmarsh, of Northampton, Mass., has invented a new fabric which is intended to supply the place of leather in many of its applications. The fabric is composed of cotton or other fibrous substances either woven into cloth or in an unwoven state, and saturated or coated with a compound of linseed oil and burnt umber prepared by boiling in every gallon of oil about three pounds of umber in a powdered state, for such a length of time, that the composition when cool will roll in the hands without sticking. The fabric may be made in forms suitable for the soles of boots and shoes, coverings for trunks, traveling bags, cap fronts, or as a substitute for carriage or harness leather, or for machine belting or hose pipe. The mode of producing the fabric differs to some extent according to the use for which it is designed, but the general principles are in all cases the same. The umber is stirred into the boiled oil until it reaches the point desired, when it is ready to be applied in the manner best calculated to produce special articles. This patent is owned by the New York and Northampton Belting and Hose Company, who have secured patents in Europe.

Smoke Consuming Apparatus.—This invention consists in the construction and arrangement of an apparatus for separating the combustible from the incombustible gases which are the products of the partial combustion in a furnace, in such a form as to make the apparatus applicable to all steam boilers or other furnaces and stoves. A chamber is constructed behind or in any convenient situation close to the furnace, and through this chamber the mixed gases pass; the heavier ones such as carbonic acid, being incombustible, pass by a bottom flue to the chimney, while the lighter ones, such as carbonic oxyd, are said to pass by an upper flue back into the furnace, there to be consumed. W. Davidson Jones, of Hagamans Mills, N. Y., is the inventor.

Composition for Japanned Leather.—The compounds commonly employed for the first, or first and second coats, in the manufacture of glazed or japanned leather or cloth, is made by boiling a certain quantity of umber in linseed oil, and adding a quantity of lampblack or other coloring matter with a quantity of camphene or spirits of turpentine about equal to one and a half times that of the linseed oil. O. S. Boyden and M. Fredericks, of Newark, N. J., have invented an improvement on the above composition, which consists in the substitution either wholly or in part for the camphene or spirits of turpentine in the compound, of a paste made by boiling flaxseed, either whole or after the oil has been expressed, and either ground into meal or unground, in water till its glutinous property is extracted. The use of this paste as a substitute for camphene and spirits of turpentine not only reduces the cost of the compound, but also renders the goods more pliable and less likely to crack.

Improved Furnace Grate.—A. J. Allen & W. S. Hudson, of Paterson, N. J., have invented an improvement in the bars of furnace grates which enables them to have a limited upward and downward movement, and by that means break up all "clinkers" or other foreign substances which interfere with the draft, and also affords facility for their passing through into the ash pit. The fuel is also distributed evenly over the bars, and thus the fire is kept more equal and likely to burn its smoke. The invention is applicable to furnaces using any kind of fuel, but is more particularly intended for the use of anthracite or bituminous coal, and may be used with especial advantage in coal-burning locomotives.

Apparatus for Distilling Turpentine.—The chief feature of novelty in this apparatus is an important one; it consists in having a chamber above the still, in which the barrels of crude turpentine are placed, having first been unheaded, and steam being admitted into the chamber, all turpentine is melted from the barrels and runs into the still. This effects a saving, as in all other apparatus the crude turpentine is scraped from the barrel, and consequently some must be wasted. The still is heated by steam, so that the fire in no place comes in contact with the inflammable material, and the danger of explosion is avoided. Daniel Reid, of Washington, N. C., is the inventor.

Hygrometer.—This invention relates to that description of hygrometer composed of a twisted cord of catgut or other substance which is caused to untwist and twist itself up by the increase or diminution of its bulk produced by changes in the hygrometric condition of the atmosphere. The improvement of this inventor—Chas. L. Clarke, of Rochester, N. Y.—consists in certain means of combining the cord with an index so that an hygrometer of this kind will serve as a weather glass.

Thermometer.—S. Holton, Jr., of Middlebury, Vt., has invented a useful improvement in metallic thermometers so that the pointer is made to indicate correctly upon a dial the variations in temperature.

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Correspondents

W. S., of Ohio.—For information relative to bows and arrows see "Boy's Book of Amusements," and kindred works. Subscription received.

D. D. C., of Mass.—You are advised to communicate your invention to some reliable individual having means and sense, and arrange with him to test and bring out your improvement. You will never be able to save six-sevenths of the cost of fuel now required.

C. L. P., of Va.—We think there is nothing patentable in your separator device.

E. S., of La'—Your plan might partially ventilate, but would not disinfect the steamer Susquehanna.

A. R., of Pa.—*Un-wang* is the name applied to the roots of certain plants of the hellebore tribe in China; but which is the precise root that the Chinese employ to drive away musquitos, we cannot say.

A Subscriber, of Ind.—No tool-makers keep on hand tools to tighten boiler tubes. You must have a conical mandrel to fit the tubes of your boiler, and tighten them yourself.

A. W. C. and G. P. D., of Mo.—You can make a beautiful oil for lubricating watches and clocks by agitating the best sperm oil with about 25 per cent of its weight of absolute alcohol. This should be done in a glass bottle for about one hour, then allow the matter to settle, in order to obtain the clear oil. The alcohol removes the water, some of the fatty acid, and the bitumen from the oil. Any oil so treated is greatly improved for lubricating purposes.

J. A. M., of Mass.—Grind up some glass or fine white sand to powder, and boil it in a strong caustic lye, and you will obtain soluble glass. It is not sold in this city.

P. M. McN., of Mich.—You can obtain any kind of colored glass from William Gibson, glass stainer and decorator, 374 Broadway, this city.

R. M., of Va.—There are no steam boilers in use in which the furnace is not placed in contact with the boiler; but in some iron works the waste heat from the smelting furnace is used to generate steam in boilers. Wood is the best fuel to employ, if you design to use a furnace separate from the boiler, as the flame extends a long distance into the flue. The horse-power of your boiler will be in proportion to the heating surface. You should allow nine square feet for each horse-power.

J. M. H., of Miss.—Catechu is employed for tanning skins, and it is a good base upon which to apply logwood and a little sulphate of iron in solution, in order to color such skins black. It will also color skins brown, but no other colors, so far as we know. Sewing machines ought to be sold cheaper than they now are. Competition does not seem to affect the price.

J. J. M., of Tenn.—Dana's Mineralogy will give you the information desired in regard to American ores. Address Appleton & Co., this city.

G. W., of N. Y.—The Babbitt patent is generally considered to be invalid in this city, as Mr. Ayres has published affidavits to the effect that he had lined iron journal boxes with a soft metal in the Staten Island dye works prior to the issuing of the patent.

S. Y., of Mass.—The best cement you can use for an aquarium is common pitch; it will not affect the water, because it is not soluble in it.

Wm. F., of Pa.—If you wish us to publish the facts set forth in your letter in regard to the sale of aluminum, you will please embody them in an advertisement, and remit the amount for its publication as per terms—25 cents per line of eight words.

T. W., of Ill.—You have not read the article carefully on page 278, relating to the filling of teeth with tin. You assert that we stated that "tin is a non-conductor." Read the article again, and you will find it states that tin is a "superior non-conductor to gold"—not that it is a non-conductor. The conducting power of gold is 200; tin, 64. Always be sure you are right before you attempt to criticise. You are correct in your opinions regarding the efficiency of lightning rods. The solid section is the grand object; the thicker the rod the better the conductor.

H. T., of Ohio.—We advise you to get a good lift pump for your salt well, and use strong wooden pipes through which to raise the water. The salt will corrode all iron, more or less; but it does not act upon cast so readily as upon wrought iron. You should also use an engine of sufficient power to keep the water low enough to repair the pump if it should get out of order, because no work of man can be relied upon implicitly. We would prefer to use a pump with two, rather than one lift. This is commonly done in deep mines.

H. M. S., of N. Y.—Where there are no ears (the auditory nerve being absent) there can be no sound. The appreciation of vibrations by the sense of hearing is sound, just as the appreciation of objects by the sense of seeing is sight. Bodies would vibrate if there were no ears, and light would shine if there were no eyes; but sound and sight would be unknown.

A. W. Wadsworth.—Please to inform us in what State your Avon is located. There are nine towns of this name in the Post-office Directory, and to make sure of reaching you we should be obliged to write nine letters. Save us this dire necessity, by sending the information we need.

H. B., of Ind.—In 1856, R. D. Nesmith, of Lake Village, N. H., took out a patent for a machine for dressing mill stones. Our opinion of it, formed from an examination of a model, is favorable. Hughes' American Miller is a tolerable work on milling. It can be obtained from H. C. Baird, Philadelphia, Pa.

A. S., of N. H.—We cannot supply the missing numbers of our paper that you want, and do not think you can get them. We are always willing to answer such requests, and to supply missing numbers whenever we have them. But such requests are very numerous, and we have repeatedly said in our columns that we should always attend to them if possible, thus hoping to save ourselves the necessity of replying in every case.—There are but three primary colors, namely, red, blue, and yellow. A green colored body reflects the blue and yellow rays which form green, while the red ray of light is absorbed. A purple colored object reflects the red and blue rays—the yellow is absorbed; and it is the same with all the other colors. You are mistaken in supposing that there are seven primary colors.

B. S., of Pa.—It is very difficult to dissolve old vulcanized india rubber in turpentine. It should first be steeped in warm oil or grease, then boiled in a lye of caustic alkali, made with potash or soda, after which it should be cut into thin slices, and placed in the turpentine. The turpentine should be kept warm in a close vessel. Naphtha is superior to turpentine as a solvent, but both require the aid of heat.

N. E. H., of Wis.—Common red ink is made with a strong decoction of red Brazil wood, or hypernic, to which is added a little alum and gum arabic. The best red ink is made with carmine, which is a preparation of cochineal. It is dear, and not in common use.

A Prussian gentleman wishes information in regard to a good machine for pegging boots and shoes. Address C. Crupadien, care Messrs. Munn & Co., New York City.

Who can supply machinery for making lime barrels? Information is also wanted in regard to the construction of a lime kiln for stone lime. Address C. H. S., Box 773, New York City.

Money received at the Scientific American Office on account of Patent Office business, for the week ending Saturday, May 29, 1858:—

J. J. P., of Ohio, $55; D. B. T., of Ohio, $25; H. R. W., of Ky., $30; W. P., of Mo., $10; I. H. Q., of Mich., $31; I. G., of N. Y., $60; J. F. T., of S. C., $25; T. F., of Mo., $30; G. M., of Mass., $30; J. I., of N. Y., $25; J. C. R., of N. Y., $55; S. R. B., of N. Y., $30; D. & M., of Ill., $20; J. S. B., of S. C., $25; D. C., Jr., of Ala., $30; D. B., of N. Y., $30; G. H., of N. Y., $30; G. H. S., of Iowa, $30; F. K., of Mass., $15; H. K., of Ind., $30; J. H. S., of Ind., $55; J. R. P., of N. Y., $250; T. W. L., of N. Y., $25; J. D. T., of Ohio, $30; J. D., of Ohio, $30; S. G., of N. Y., $30; W. H. Van G., of N. J., $30; J. H. I., of Ill., $10; J. P. K., of L. I., $30; N. C. P. S., of N. Y., $30; H. & W., of Mich., $25; B. R., of Mass., $27; B. A. R., of Conn., $25; H. C. W., of Mass., $30; A. S., of Ohio, $20; A. F., of N. Y., $25; A. D. S., of Vt., $35; J. H., of Mass., $30; J. A. T., of Ohio, $30.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, May 29, 1858:—

D. & M., of Ill.; H. R. W., of Ky.; J. J. P., of O.; E. T. B., of Ga.: G. H., of Mass.; J. I., of N. Y.; D. B. T., of Ohio; J. F. T., of S. C.; J. H. P., of N. J.; J. S. B., of S. C.; K. & B., of N. Y.; A. F., of N. Y.; B. R., of Mass.; T. W. L., of N. Y.; J. C. R., of N. Y.; H. & W., of Mich., McC. & B., of Mo.; B. A. R., of Conn.; A. S., of Ohio, (2 cases): A. D. S., of Vt.

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PATENT CLAIMS—Persons desiring the claim of any invention which has been patented within fourteen years, can obtain a copy by addressing a letter to this office, stating the name of the patentee, and date of patent when known, and enclosing $1 as fee for copying.

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Consultation may be had with the firm, between nine and four o'clock, daily, at their principal office, 128 Fulton street, New York. We have lately established a Branch Agency on the corner of F. and Seventh streets, Washington (opposite the United States Patent Office). This office is under the general superintendence of one of the firm, and is in daily communication with the Principal Office in New York, and personal attention will be given at the Patent Office to all such cases as may require it.

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The annexed letter from the late Commissioner of Patents we commend to the perusal of all persons interested in obtaining patents:—

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Science and Art.

Gum.

This word stands for a number of substances which, when dissolved in suitable liquids, possess a powerful adhesive property, and the common and well-known gum-arabic may stand as a type of the class. It is the product of an acacia, and was originally imported into Europe from Barbary and Morocco. In its purest condition, it forms white or rather yellowish masses, which are destitute of any crystalline structure, and break with a shell-like fracture. Its solutions are wrongly called *mucilage*, which is an entirely different substance. Gum-arabic dissolves in cold water, from which the pure gummy soluble principle can be precipitated by alcohol and by basic acetate of lead. Arabin is composed of 42·1 per cent of carbon, 6·4 per cent of hydrogen, and 51·5 per cent of oxygen, which, by a curious chemical coincidence, is exactly the composition of crystallized cane sugar, and it illustrates the fact, that among organic bodies, substances of the same ultimate composition may have very dissimilar properties.

Another gum is *mucilage*, very abundant in linseed, in the roots of the mallow, in salep, and in the fleshy roots of the orchis and other plants. It is soluble in cold water, but is less transparent than gum-arabic, and it is precipitated by the neutral acetate or sugar of lead.

Gum Tragacanth is chiefly composed of a kind of mucilage to which the name of *bassorin* has been given, and which does not dissolve in water, but simply assumes a gelatinous aspect. Caustic soda or potash will dissolve it. The principal use to which this gum is put is in the manufacture of marbled paper, where it forms the bath on which the colors are thrown, and from which they are taken up by the paper.

Cerasin is the insoluble portion of the gum of the cherry tree, and is nearly like *bassorin*. Mr. Schmidt has determined the composition of these various substances, and has found them all more or less allied to starch, invariably containing hydrogen and oxygen, the proportions in which they form water, and all when treated with acids yield grape sugar.

The jelly of fruits or *pectin* is closely related to the gums, but as yet chemists have not paid much attention to it, and consequently much that is said of it is merely conjectural.

New Car Brake.

The subject of our illustration is a railroad car brake of an improved construction, combined with small wheels that are placed between the main wheels of the locomotive and cars, so that when a train is passing over a curve, the small wheels can be lowered on to the inside rail of a curve, and from their small diameter and being free from the outside wheel they will prevent the cars running off the track. These small auxiliary wheels can be lowered or raised by means of a jack-screw, and can be made to lift the main wheels off the rail, and let the car run on them entirely, so that a car may be stopped or its speed slackened on a curve with perfect safety.

In our engravings, A represents the truck frame of a car; B B, B′ B′, the main wheels; C C′ the auxiliary wheels, which are arranged between the main wheels, being attached by their axles, D D′, to the perpendicular portions, *a a*, of jack-screws, E E′, and are made to rise and descend by means of cogged sectors, G, which are on the shafts of the jack-screw pinions, H, and are caused to perform circular vibrating movements by means of horizontal rack bars, I, which have horizontal teeth, *b*, to gear with the sector teeth and other teeth which gear with the pinions of the vertical windlass shafts, L L′. The auxiliary wheels, C C′, are held in place, while elevated as shown in Fig. 1 by means of curved suspended blocks, *d d*, which are pivoted to the guide boxes of the jack-screws, and are compound in form, internally to the curve of the small wheels and externally to the curve of the large main wheels. These blocks also serve as guides and stays to the auxiliary wheels when the small wheels are down upon the rails. With this arrangement of auxiliary wheels, it is evident that, by turning one of the windlass shafts, L, the rack bar, I, will cause the sector, G′, to turn, and the jack-screw, E, will descend, and carry with it the small auxiliary wheel, *c*, which, by coming in contact with the rail of the inward curve will elevate the inner side of the truck frame and the main wheels, B B, above the rails, and thus cause the weight of the car to rest upon itself and upon the main wheels, B B. The car thus adjusted, and with the auxiliary small wheel, C, elevated, will be in a condition for running with safety round the curve, as the small auxiliary wheel, C′, will, owing to its decreased diameter, allow the large main wheels to travel over at much greater length of space than they themselves travel over, as may be necessary to compensate for the difference between the length of rail forming the outer and inner curves.

The brake which is adopted for each car consists of four curved shoes, M M M M, one arranged to press on the upper part of the periphery of each main wheel. These shoes are connected together by means of transverse trusses, which are united and supported

SOLOMON'S IMPROVED CAR BRAKE.

Fig. 1

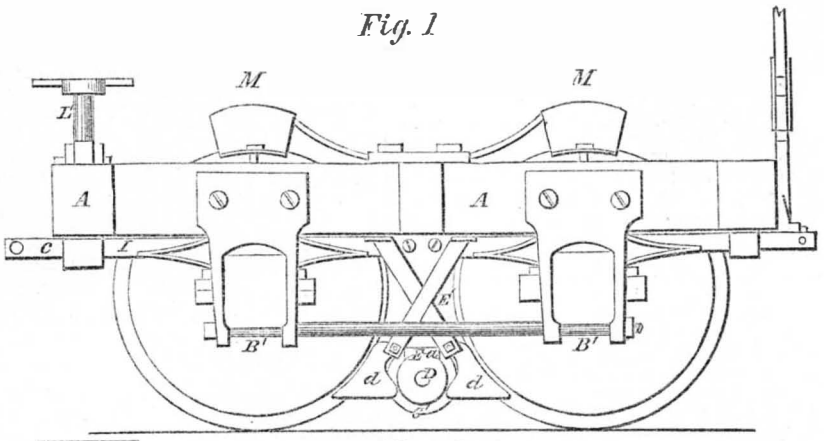
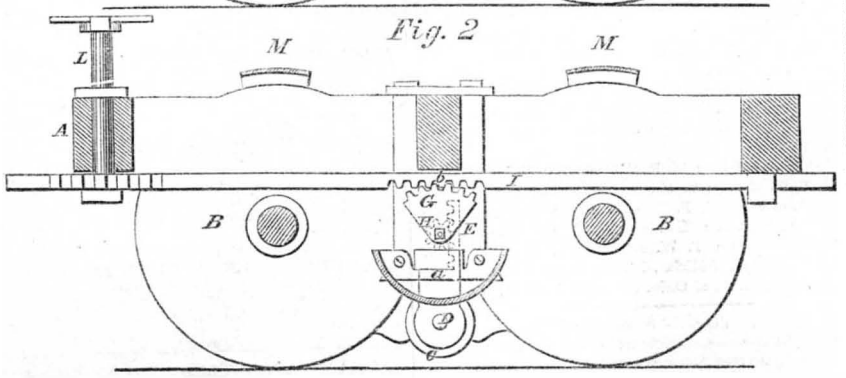


Fig. 2



by an inverted arch. The braces and arch rest upon a transverse arm that has one of its ends suspended on a spring, and its other end pivoted to a vertical standard which is held in place, and supported by transverse beams, *p*. Above the loose or suspended end of the arm a longitudinal turning rod is arranged. This rod extends from end to end of the truck, and has a vertical brake-up lever, S, at one end, and a projection or cam at its center. The cam is grooved so as to receive the loose end of the arm on its underside, and the lever has a pawl pivoted to it which takes into a ratchet segment, and holds the brakes applied to the wheel so as to exert any amount of friction desired. There are springs for throwing the brakes up off the wheels when the ratchet and pawl are thrown out of gear.

With this arrangement of brake it is evident that an equal pressure will be exerted upon all the wheels at the same time, by simply turning the rod in one direction, owing to the cam projection acting upon and depressing the pivoted arm, which is attached to and supports the arch, and the trusses to which the brakes are applied. This arrangement of brake is peculiarly adapted for use in connection with the small auxiliary wheels, as its shoes do not interfere with said wheels or their up and down adjustment. It is also better, as may be well known, than those arrangements of brakes which press longitudinally, and upward against the wheels, as it does not strain the springs upon which the boxes rest.

The inventor is J. C. Fr. Solomon, of Baltimore, Md., and it was patented by him March 30, 1858. We noticed this improvement on page 243 of the present volume of the Scientific American, and the inventor will be happy to furnish any further information upon being addressed as above.

Hudgin's Method of Coupling Pipes.

Fig. 1

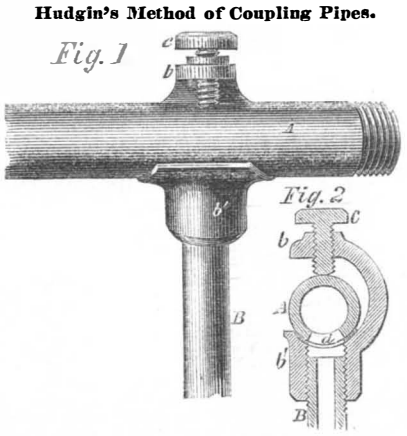


Fig. 2

When gas or water pipes are laid, much time and labor are expended, and consequent expense incurred in joining the branch pipes to the main, and in connecting the supply pipes to the branch. The branch pipes are usually cut in two, their ends are then cut into a screw thread, and both tapped into a joint constructed on purpose. The method invented by W. Hudgin, of Washington, D.C., and patented by him April 6, 1858, is an extremely simple and cheap method of saving labor, material and time, and forms in every way as perfect a joint as the plan at present adopted.

Fig. 3

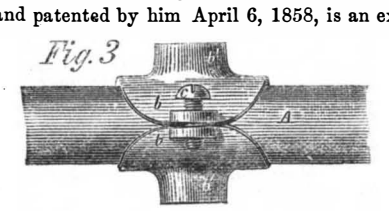


Fig. 4

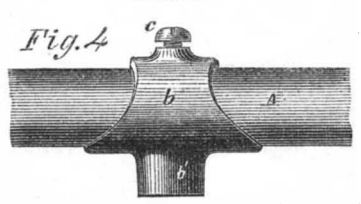


Fig. 1 shows the joint as applied to a pipe already laid down, and Fig. 2 is a section of the same. Similar letters indicate the same piece in all the figures. A is the pipe to which another is to be connected, and B′ is the pipe that is to be connected to it. The pipe, B, is screwed into the pipe portion, *b′*, of the clamp, *b*, and a hole is then cut with any suitable tool in the pipe, A, and seen at *d*, Fig. 2, and a washer of india-rubber or leather being placed around it, the clamp, *b*, is then passed over the pipe, A, and the screw, *c*, turned until the whole is perfectly secure. By this means a good joint is made, as can be seen from the engraving.

Fig. 3 shows this clamp adapted to attaching two pipes to one, a hole being cut on each side of A, and a clamp being used which is tightened by the screw, *c*, passing through a female screw cut in a flanch on each side of the clamp, and Fig. 4 shows the method of attaching a pipe to a branch or main when both are laid down together. The saving of this invention is chiefly as before enumerated in labor and time. By the usual plan, a great number of small pieces of pipe are wasted, being cut off to make a joint at the proper place, and then it being more advantageous to place a length on next, instead of the short piece; these are all saved in the present invention, as the pipe is not severed, and the hole, *d*, can be made in exactly the same time and with as common tools as are used in cutting the pipe in two.

Any further particulars can be obtained by addressing Messrs. Biggs & Southwick, No. 84 Nassau street, New York.

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